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Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

Vo. 246. 97th Year. LONDON, OCTOBER 31, 1945. Registered as a Newspaper. No. 4302. Price 1/-

PURIFIERS

by Dempster OF ELLAND

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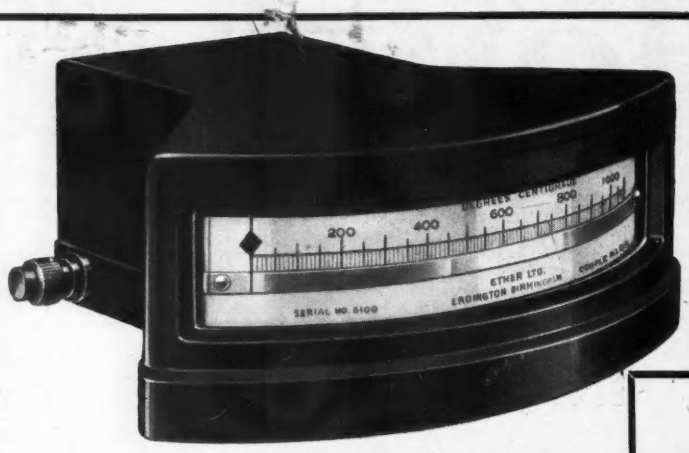

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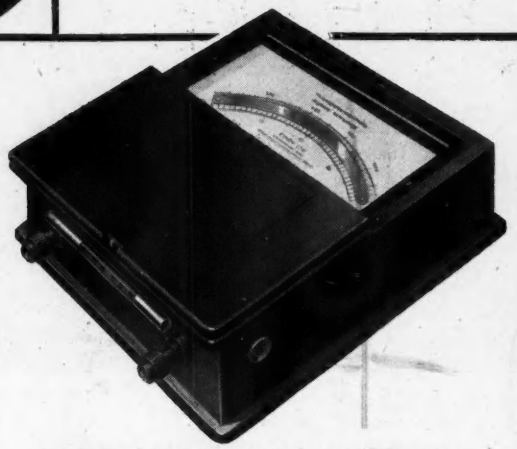

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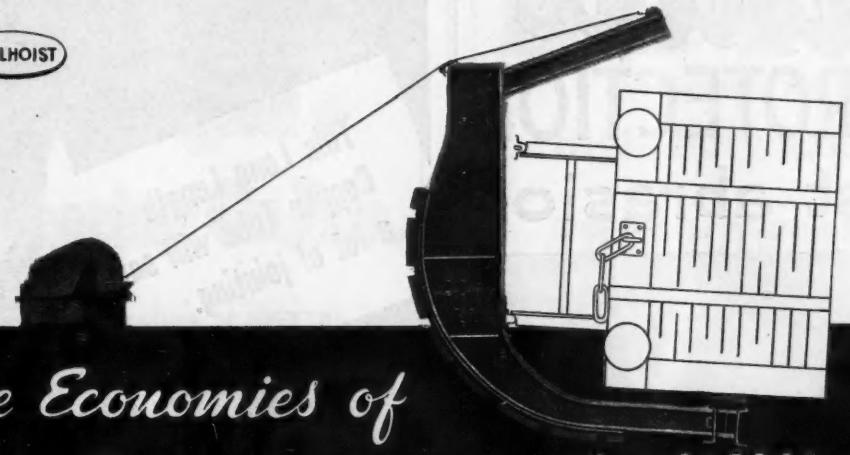
THE BRYAN DONKIN COMPANY LTD.

Gas Works Plant Engineers, CHESTERFIELD

GAS JOURNAL, OCT. 31, 1945

VOL. 246 97th YEAR No. 4302

STEELHOIST



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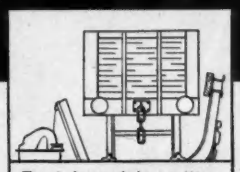

Truck in upright position before tipping

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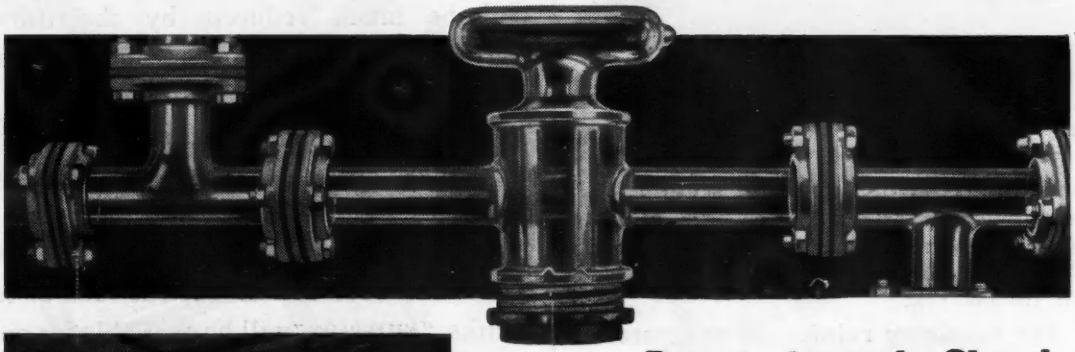

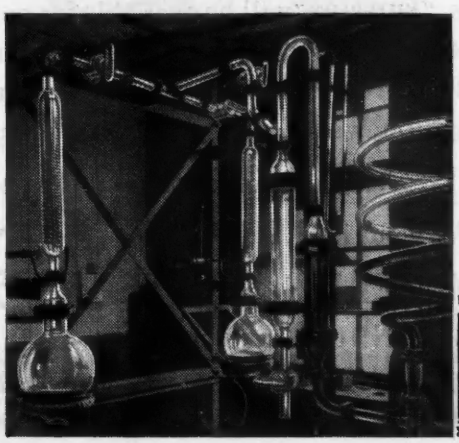

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It's cleaner! safer!!

Being transparent, PYREX Brand Glass Pipe Lines permit the inspection of flow, colour and freedom from contamination of the liquids they carry, while crystallization, sediment or lime formation can all be readily detected.

PYREX Brand Glass Pipe Lines withstand pressures up to 50 lb. per square inch, and can be flushed and sterilized with steam, hot water or hot acid solutions.

The illustration on left shows an Assembly made up from standard units of PYREX Brand Pipe Lines and PYREX Brand Laboratory Glass. We are frequently asked to build up Assemblies such as this, and we shall be pleased to co-operate with any research chemist or manufacturer in a similar manner.

JAMES A. JOBLING & Co. Ltd., SUNDERLAND

P.44

PYREX GLASS PIPE LINES

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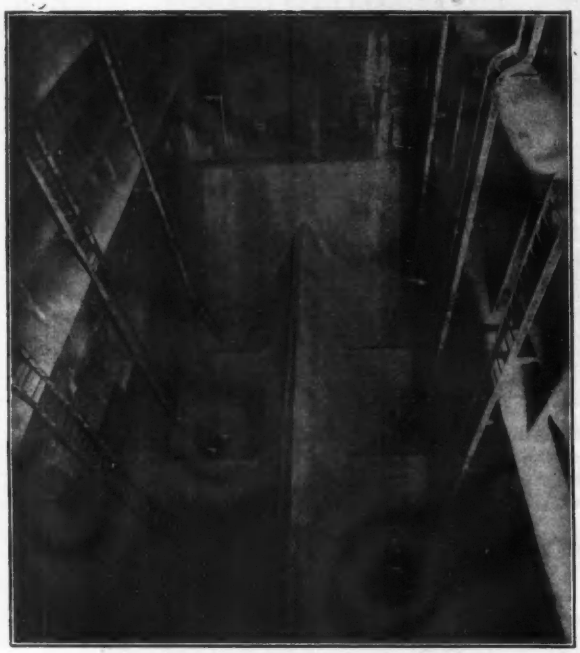
Gunite is PROTECTION against abrasion



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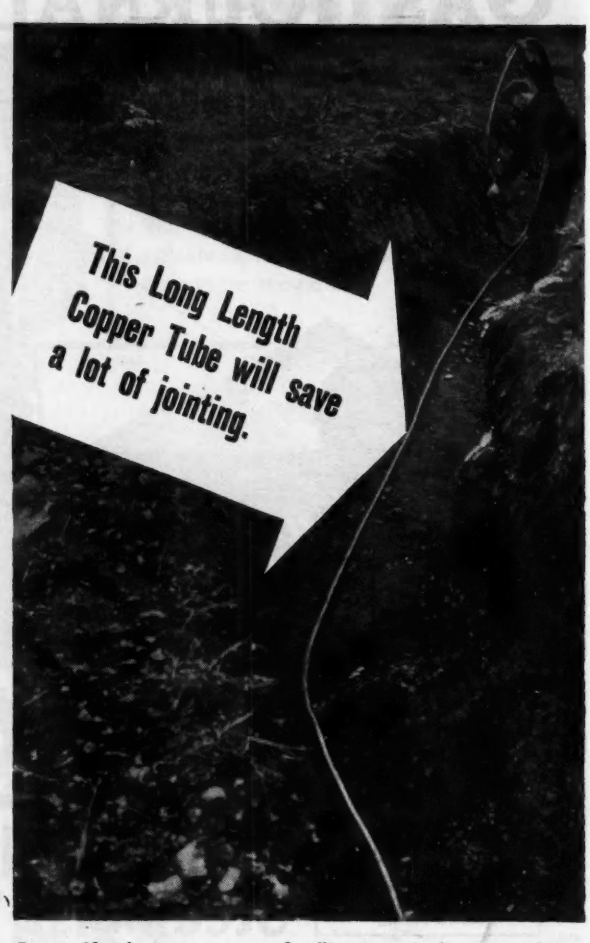

Installation costs of Gas supply services will be much reduced by the use of "KUTERLON" Long Length Copper Tube which is now supplied in coil form in lengths up to 60 ft. Annealing or the use of mechanical bending appliances are not necessary. Bending can be done by hand, and the tube can be laid easily in trenches and run round obstructions such as rock or tree trunks. "KUTERLON" will be available for post-war reconstruction, but meantime is supplied to current licensing regulations. Full information will be supplied on request.

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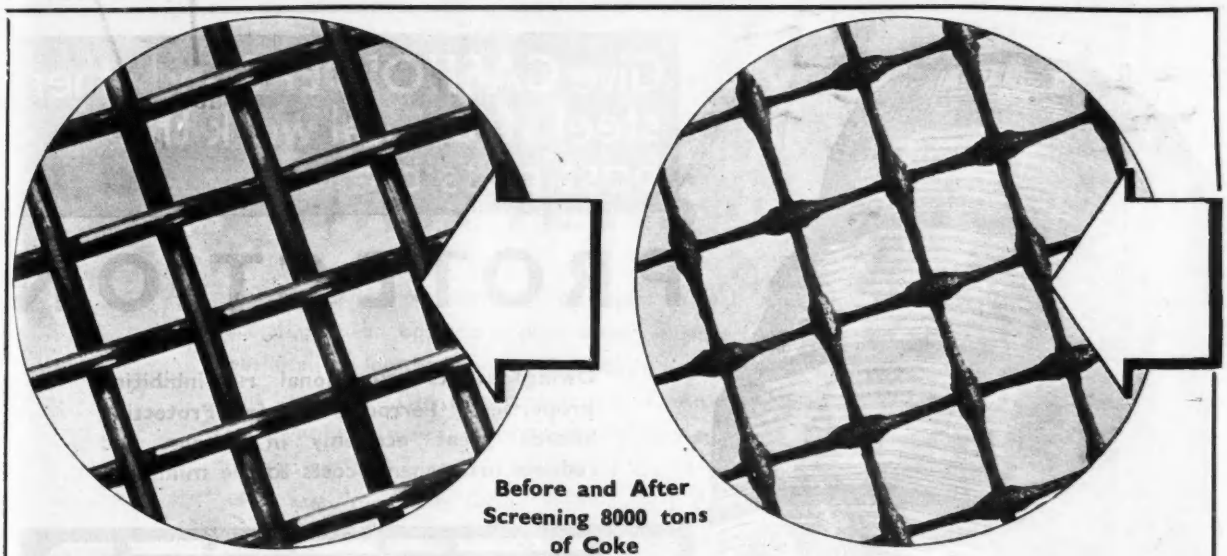

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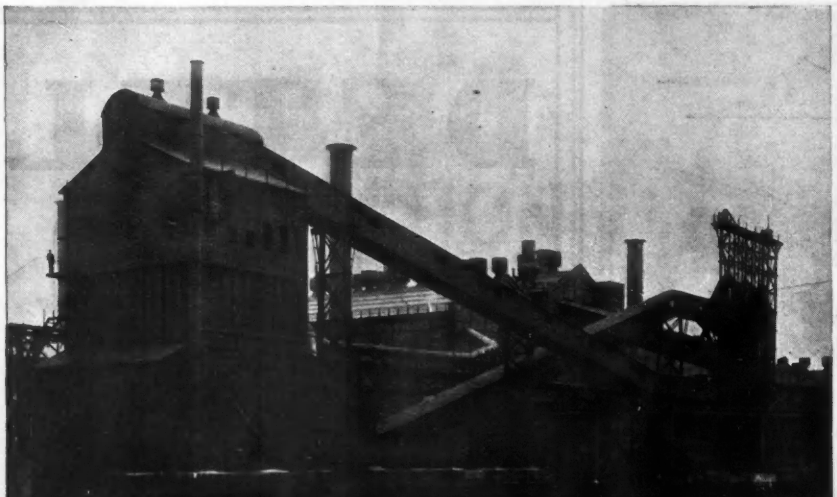

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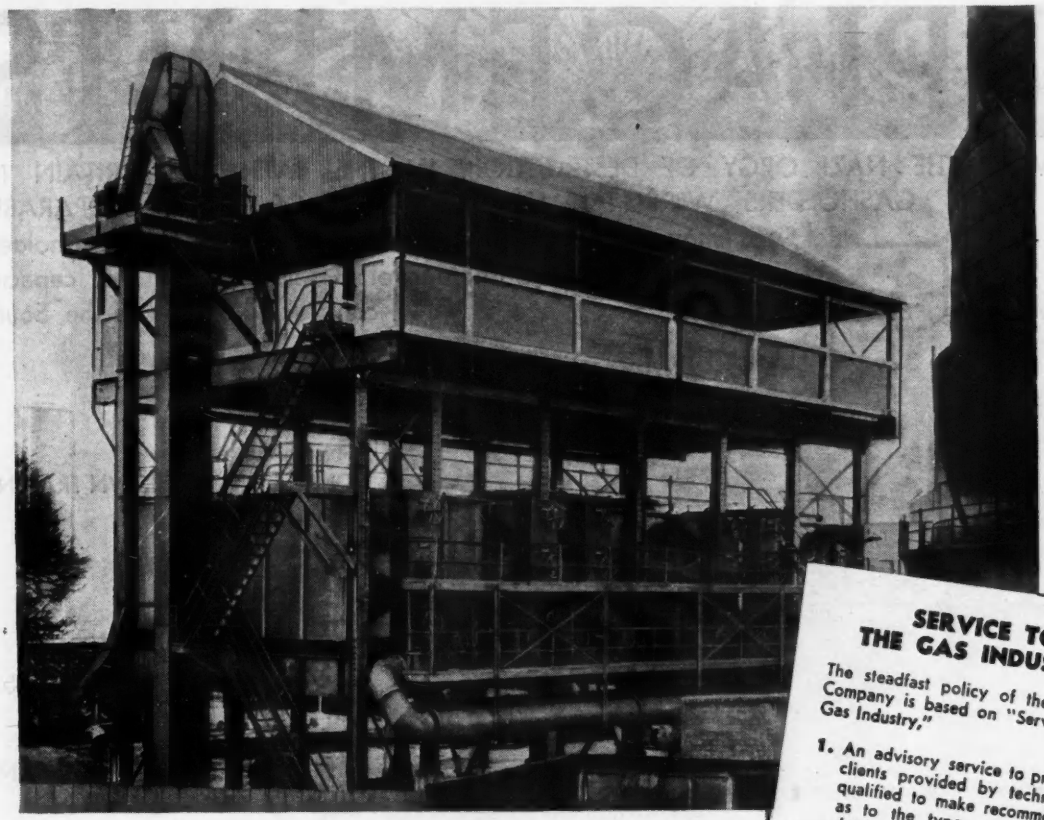

SERVICE TO THE GAS INDUSTRY

The steadfast policy of the Whessoe Company is based on "Service to the Gas Industry."

1. An advisory service to prospective clients provided by technical staff qualified to make recommendations as to the type, arrangement and details of plant and processes.
2. Designers and chemical engineers experienced in the Industry's needs.
3. Works manufacturing facilities greatly enhanced by war production experience.
4. Erection, operating and service staff skilled in their duties

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An appreciation of purification principles as well as a wide knowledge of actual purifier operation, plus sound engineering standards, form the qualifications for the Whessoe Company's purifier work. Whessoe purifiers suit the duty. Two recent contracts: 1. An installation of welded mild steel purifiers (shown above), complete with structure, handling equipment, connections and valves. These boxes are 11 ft. deep. 2. An installation of 5 cast iron boxes (under construction), each 45 ft. × 35 ft. × 6 ft. 2 in. deep in a building 180 ft. long by 50 ft. wide by 41 ft. 3 in. high. Handling plant, connections and valves are included. Whessoe purifier preheaters are part of the equipment in both these contracts.

Enquiries invited, technical information gladly supplied.

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THE WHESSOE FOUNDRY AND ENGINEERING COMPANY LTD

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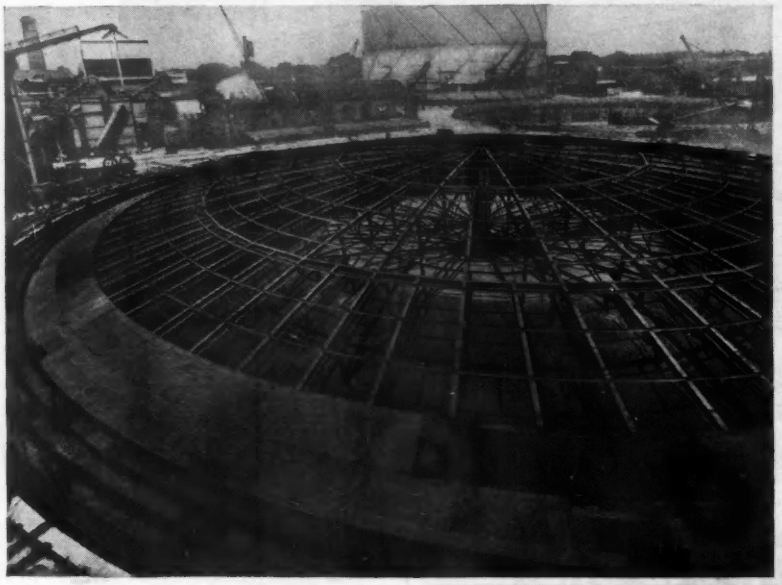
FOLLOWING THE NAZI ORGY OF DESTRUCTION IN THE BATTLE OF BRITAIN IN WHICH MANY GASHOLDERS WERE TOTALLY DESTROYED OR MADE IRREPARABLE

Below is shown a section of the replacement of such a Gasholder, a four-lift Spiral-guided Gasholder of 3 million cubic feet capacity constructed by us in the South



View on the left shows
COMPLETION OF CROWN FRAMING

View below shows
COMPLETION OF CROWN PLATING

IF YOU HAVE ANY STORAGE PROBLEMS
ASK US TO ASSIST IN SOLVING THEM

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GAS CHEMICAL & CONSTRUCTIONAL ENGINEERS

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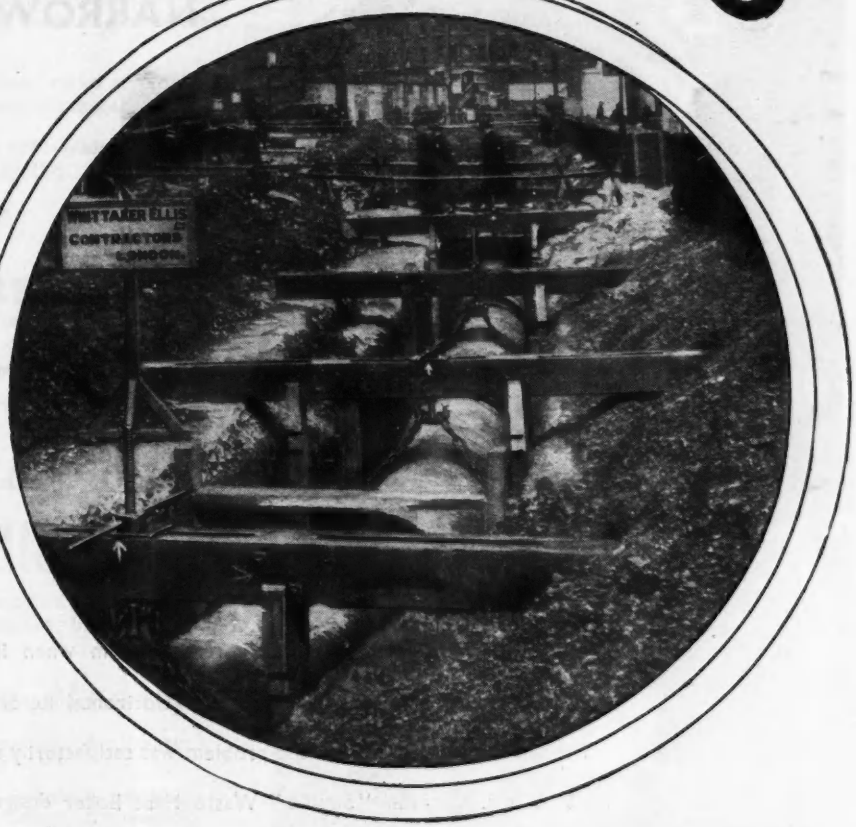

In other words—we don't confine ourselves to the big jobs. We also undertake schemes on a limited scale. Large or small, mainlaying, concrete foundations and awkward connections to gas works plant, we have the reputation of completing any work entrusted to us, to the entire satisfaction of all concerned.

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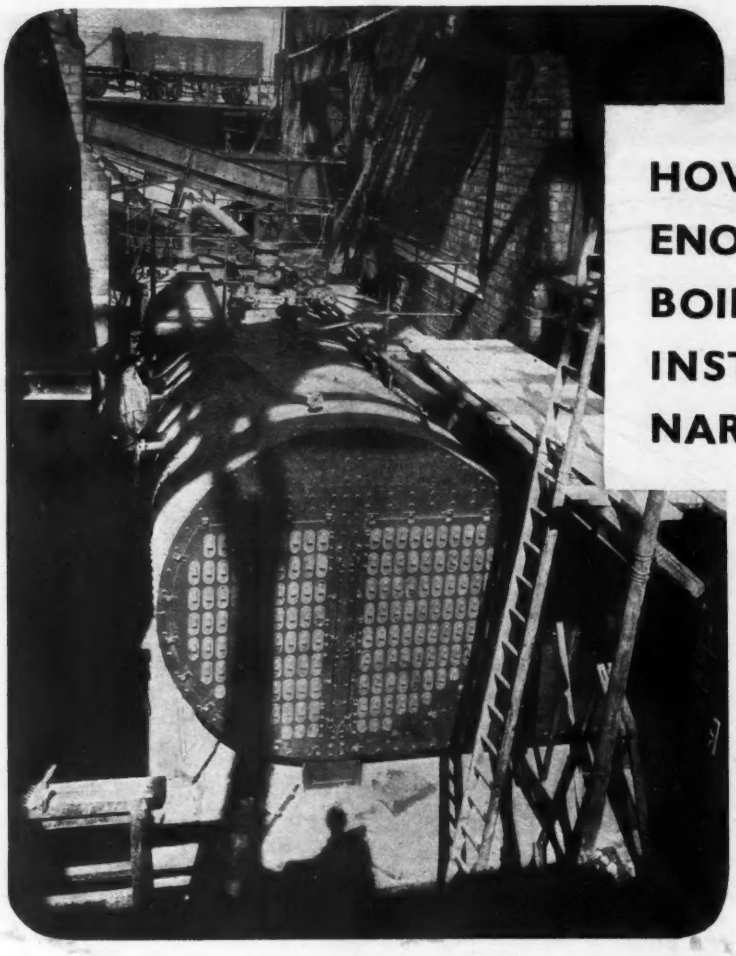

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For this purpose the H.A.S. gas-fired Air Heater Unit is ideal.

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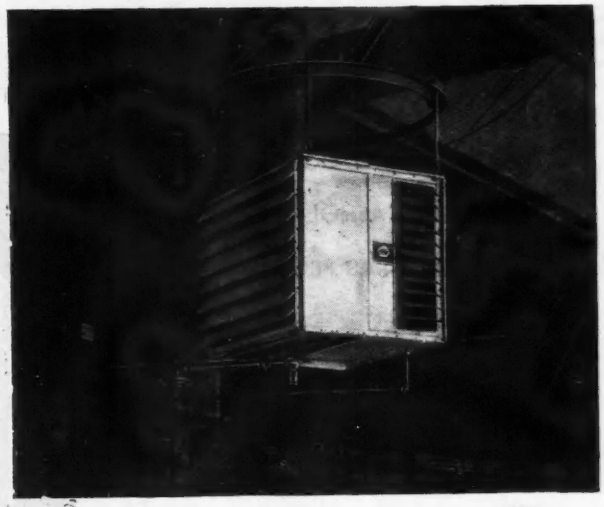
We can instal complete system (including gas piping), or supply individual units. Full details on request.



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RECONSTRUCTION. *Architects and others interested should consult us on their problems. Our advice will be given freely.*

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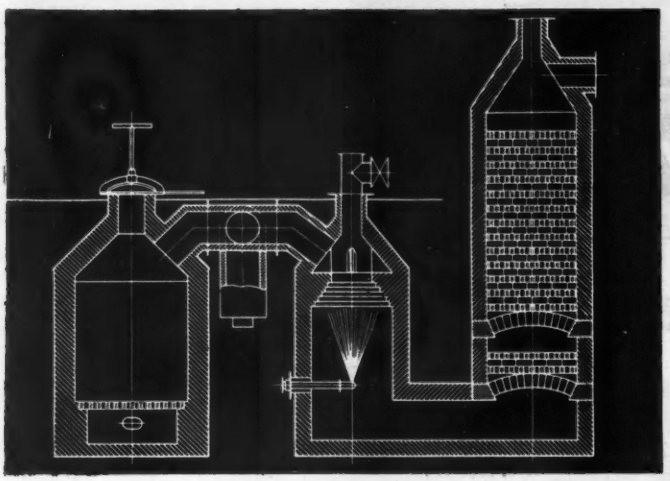
IGNITION DOME CARBURETTED WATER GAS PLANT

(As developed by the Semet-Solvay Engineering Corporation)



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ANY SIZE UP TO UNIT CAPACITIES OF 10,000,000 CUBIC FEET/DAY

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★ IDEAL FOR DILUTION PURPOSES
★ NO RELIEF GASHOLDER REQUIRED
★ CONSTANT GAS FLOW
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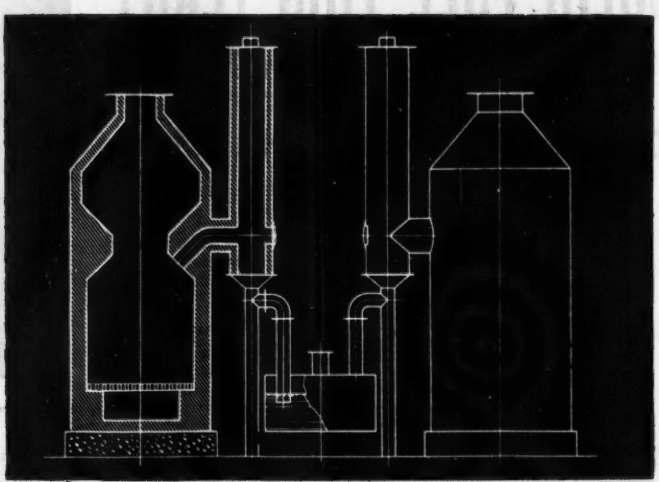
★ INCREASED THERMAL YIELD PER TON COAL CARBONISED



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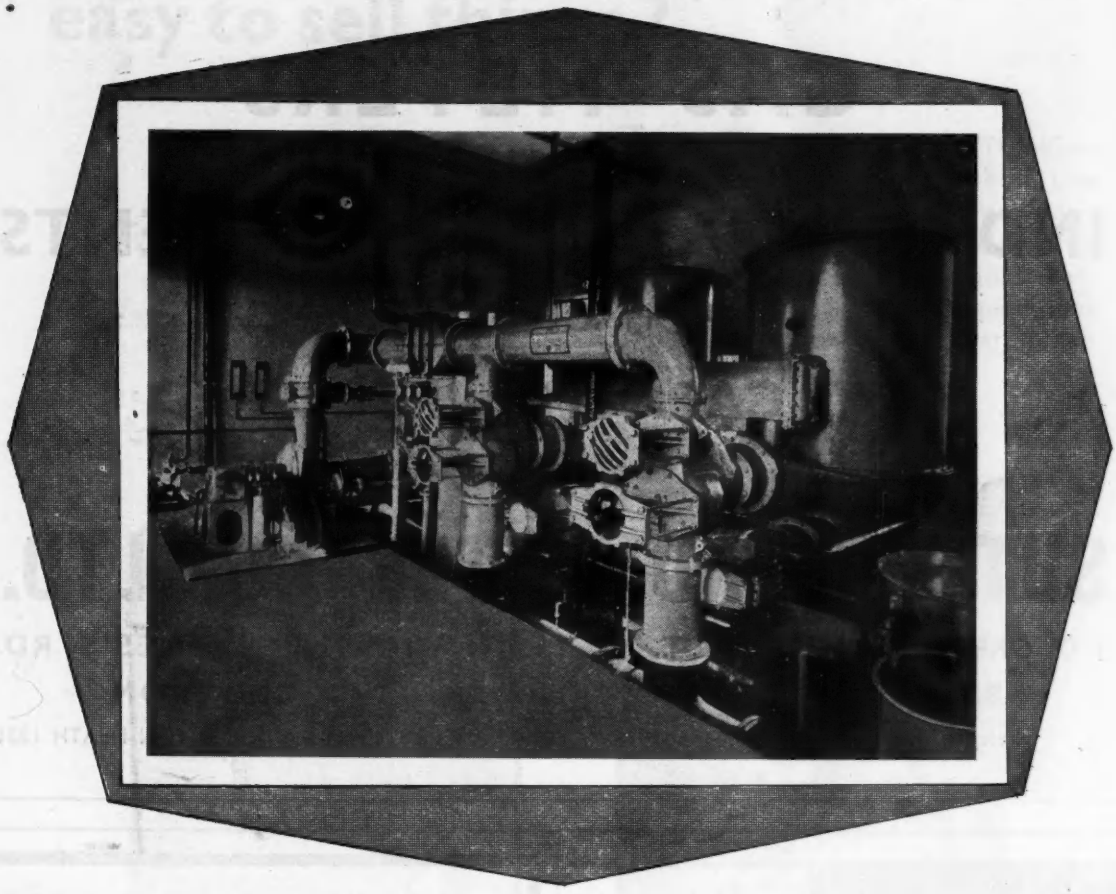

What experience means to benzole recovery in the Gas Industry!

The plant you see above is typical of many Sutcliffe Speakman plants already supplied to the Gas Industry.

They are the result of over 20 years' experience in the manufacture and use of Active Carbon for recovery purposes in every branch of industry where solvents are used. They range in size from a capacity of quarter of a million cu. ft. per day, up to 86 million cu. ft. per day, recovering millions of gallons of valuable solvent per annum, which would otherwise have gone to waste.

As applied to the Gas Industry, they extract the maximum amount of Benzole; 100 per cent. recovery having been recorded. The Benzole produced is water white, giving the highest possible distillation test. There are no secondary distillation products.

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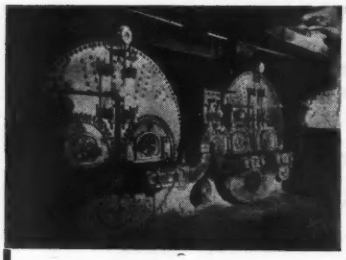

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ALL CLASSES OF FUEL

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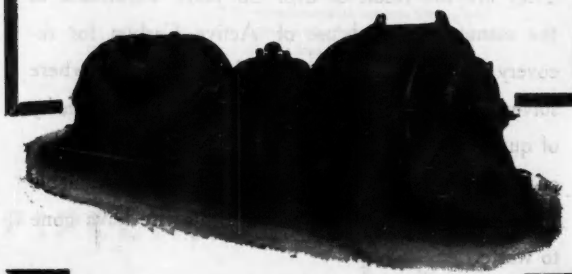

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Victory shopping will become a search for the latest equipment.
Equipment in which the expectations of Big advances on pre-war design have been realised . . . .

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HUMPHREYS & GLASGOW LTD.

A "Labourless" Carburetted-Water-Gas Plant

having a Guaranteed Daily Capacity of 2,300,000 Cubic Feet gave the following *Actual Results* over a period of *Seven Days*:

Total Gas Made	17,732,000 cu. ft.
Daily Rate of gas production	2,535,000 cu. ft.
Calorific Value of gas	503·5 B.Th.U.
Waste Heat Steam Produced per 1,000 cu. ft.	57·1 lb.
Oil used per 1,000 cu. ft.	2·0 gall.
Dry Coke charged into generator per 1,000 cu. ft.	27·1 lb.
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H. & G. Water-Gas Plants range in Unit Capacity from 80,000 to 9,000,000 cu. ft. Daily.

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H & G

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Established 1892

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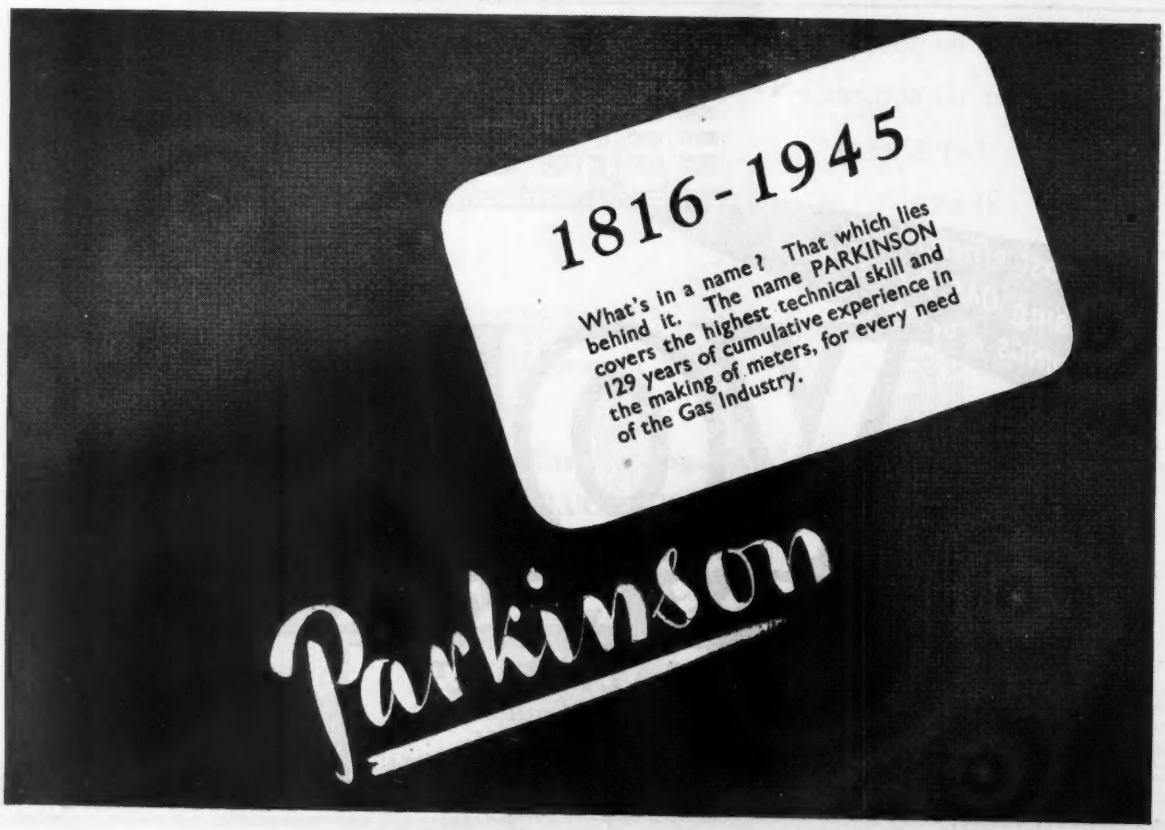
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GAS JOURNAL, OCT. 31, 1945

VOL. 246 97th YEAR No. 4302

EDITORIAL NOTES

THE COKE OVEN INDUSTRY

TWENTY-SEVEN years ago, at the fourth annual meeting of the young Coke Oven Managers' Association, the then President, Mr. D. V. Hollingworth, reviewed the problems and possibilities of the industry and summarized his conclusions in these words: "I am sure, gentlemen, that you will agree with me that in the future coking plants will have a choice of two great directions of development: (1) to become huge light and power producers, or (2) to become huge centres of chemical activity." In the intervening years much has happened and considerable technical progress has been made in many industries, and not least in those connected with the utilization of coal. It can hardly be said, however, that the coking industry has fulfilled either of the functions proposed for it by its fourth President. It is true that the industry which then sold comparatively small quantities of gas for public used now supplie some 47,000 million cu.ft. a year to the Gas Industry, in addition to very large amounts used in steelworks. In the intervening years, moreover, there has been a change of emphasis, so that whereas coke ovens were originally conceived as a method of upgrading otherwise worthless coal (the Minister of Pensions at the annual luncheon of the Association last week stated that in his days in the pit the small coal was left in the mine as being worthless), they are now regarded as a means for producing blast furnace coke of the highest possible quality; three research committees have been at work for many years upon an enquiry as to how the quality of furnace coke can be improved. The coke ovens have not become "light and power producers," but they have become factories wherein refined fuel is produced in huge quantities partly as a fuel and partly as a chemical reagent for metallurgical reactions.

Would it be fair to suggest that in spite of obvious advancement, the coke oven industry has failed to live up to its early high promise? Perhaps that question is best answered from the internal evidence available from the annual general meeting of the C.O.M.A. that was held last week. Sir John Duncanson, formerly Controller of Iron and Steel Supplies and now head of the British Iron and Steel Federation, gave the industry this advice: "Continue to address yourselves to scientific improvements. Concentrate on the problem of supplying the fuels most appropriate to the regions in which they are prepared. Study to produce domestic coke of suitable quality and to manufacture synthesis products from the gas." The coke oven industry has advanced but little along the lines of major chemical development, nor has it borne any part in the production of power or light; but it has become a great fuel industry. In that it has done a work of high national importance. It is becoming recognized that carbonization is a means of conserving coal. Our coal reserves, according to the surveys of the coalfields that have lately been issued, may be on the verge of exhaustion within 100 years from now; it has been suggested they will be exhausted in the commercial sense at the present rate within 150 years. Coal conservation is vital as a long-term policy. Coal is now dear. It can hardly become cheaper quickly, and if there should be some small fall in prices, it is probable that the fall will soon be obliterated by the normal functioning of economics. Rising prices have been the general experience for at least three centuries past. That means that the less fuel that can be used to do a given work, the lower will be manufacturing costs. To turn raw coal into refined products, such as town gas and coke, is to enable less fuel to be used for a given work, and leads to coal conservation and lower production costs in industry. The coke oven industry has certainly not failed. It has done work of the highest national importance.

The proper question to ask is whether the coke oven industry has made the most of its chances. It differs from the Gas Industry in that hitherto it has not been classed as a public utility charged with the maintenance of the public supply of fuel; it has been free to develop in any way found profitable, and it has always been essentially a coal processing industry. That position may be changed in the future, and the power to develop may be taken from it. All the signs point to the emergence within the comparatively near future of a policy of smoke abolition officially sponsored, though not necessarily by compulsory measures for some time to come. That will mean that the supply of smokeless fuel must be materially increased. Is the industry ready for that? Are coke ovens in general ready with plant and equipment, and the necessary knowledge based on experiment, to manufacture coke for domestic purposes? Coke oven gas is used for chemical manufacture abroad, and developments in other industries have shown the need for increased chemical production from coal, based on carbonization. Very little has been done in this country, though ethylene is to be recovered at certain plants. Lord Leverhulme has pointed out that development is rarely made consciously, in that a need is disclosed and research workers set out to satisfy it. The method of progress is more usually by making a product and then showing the world how it can be used. That requires commercial courage and a certain spirit of adventure. Dare we suggest that that spirit of adventure has been lacking in the coke oven industry? It is a bold question, and we may be taken to task for asking it. We should not put the blame on the coke oven manager. He, as disclosed in various past presidential addresses, has been for years fully aware of the possibilities of chemical development; but there has been a restraining hand upon him. That restraining hand has probably been the conservatism of boards of directors, who have rather naturally (but inexcusably) failed to launch new ventures into the paths of chemistry, to them untrodden and unexplored territory.

The new President, Mr. Neville Warwick, has no doubts about the wisdom of Sir John Duncanson's advice so far as concerns chemical development. Pointing out that renewed attention is being given to the subject of chemical utilization and the production of organic compounds from coke oven gas, he says: "Evidence of passing beyond the theoretical stage is shown by the active consideration being given to ethylene extraction and the initiative of firms who are installing specialized plant. With the technical brain power at this country's disposal we might organize ourselves and work alongside the American petroleum industry to some advantage. It is for us to decide now if we intend to stop at ethylene recovery or to go a stage further to the partial separation of methane. Is the total fractional separation of all the constituents by means of liquefaction too ambitious at this stage?" These are only some of the possibilities envisaged by Mr. Warwick. It is still within the power of the coke oven industry to become "huge centres of chemical activity." It may be that the change of ownership of the mines will promote this development. Some coke ovens may be linked to the Gas Industry; some may concentrate upon chemical development. There is room for both, and this country wants all the highly skilled technical processes that can be successfully operated. The coke oven industry may well find that its years of opportunity really lie ahead.

THE BUDGET

ON the whole the Budget which Mr. Hugh Dalton introduced last week appears to have been appreciated by the Gas Industry as an acceptable first instalment of the fruits of victory. The immediate removal of the 33.3% purchase tax from a number of heating, cooking, and water-heating appliances that are essential to the immediate housing programme gave the greatest satisfaction to the Industry in general and to the appliance manufacturers in particular. There now remains only one real obstacle to the restoration of an adequate flow of new appliances on to the market, and that is the labour shortage. There is ample capacity in the Industry to meet all requirements, but until the manufacturers can get the necessary workpeople they will be unable to turn out anything approaching the required number of appliances. The worst of the bottle-necks, we believe, are in the moulding and enamelling departments, in both of which there is pressing need for skilled labour.

The items from which the tax has been removed, as from Oct. 24, are: Coal and coke stoves, grates and fireplaces (and parts thereof); gas and electric fires, radiators and convectors, oil heaters; coal and coke cooking ranges (and parts thereof), gas, electric, and oil cooking stoves, boiling rings, grillers, and hotplates; independent domestic boilers, geysers, immersion heaters and similar water heaters, wash boilers and coppers, and refrigerators. While the Industry is thankful for this measure of relief, it is rather disappointing to note from a Customs and Excise notice that certain other items which in these days are very necessary, if not actually essential, remain subject to the tax, such as drying cabinets, gas cooker lighters, gas pokers, irons and ironing machines, and dish washers.

To what extent the contracting side of the Industry is concerned with Excess Profits Tax we do not profess to know, but the reduction from 100 to 60% will be appreciated wherever it is effective, even though for every pound of E.P.T. saved by the lowering of the rate of tax, 9s. will have to be paid in income tax. The Industry as a whole is closely concerned with the Hydrocarbon Oil Duties, and will have noted with satisfaction that the Chancellor has decided to give effect to the recommendation of the Hydrocarbon Oil Duties Committee, upon whose report we commented at some length on April 18 (p. 495) that imported hydrocarbon oils should be free from duty when used as raw materials in chemical synthesis, and that equivalent allowances should be made in respect of oils produced in this country and used for similar purposes.

One other aspect of the Chancellor's Budget speech of interest to the Gas Industry was the fixing of April 6, 1946, as the date for bringing into effect legislation introduced by his predecessor, which provides for allowances for income tax purposes in respect of various kinds of capital expenditure by productive industry, including most important expenditure upon research, which Mr. Dalton agreed must be encouraged. "We have not had enough of it and we want to have more," remarked Mr. Dalton. The scheme of allowances was agreed in the latter part of the last Parliament with a view to helping industrial re-equipment, and it is good to know that its operation is not to be delayed beyond next April.

Personal

Mr. W. BROWN, Buckhaven, has been appointed Assistant Engineer and Manager of the Falkirk Gas Department.

* * *

Mr. G. E. HANDLEY, Works Superintendent at the Dukinfield works of the North Cheshire and District Gas Company, has been appointed Assistant Engineer and Manager of the Wells Gas Company (Somerset).

* * *

Mr. S. K. PATTERSON, Senior Technical Assistant, Dunfermline Gas Department, has been appointed Assistant Engineer and Manager to the Galashiels Gas Company.

* * *

After six years' active service, Lieut.-Colonel R. J. J. BALE has resumed his position as Director of the Kleenoff Company (Bale & Church, Ltd.).

Mr. A. BLENKIRON, Shift Engineer of the Bradford Gas Department, has been appointed Assistant Engineer of the Lowestoft Water and Gas Company. On leaving Bradford he was the recipient of an electric clock and dinner and tea service from his colleagues as a token of their good wishes after 18 years' service with the Department. While at Bradford Mr. Blenkiron served in the laboratory, mechanics' shop, drawing office, distribution section, and the gas manufacturing section at the Birkshall works.

Obituary

The death has occurred of Mr. W. E. T. HEMS, at the age of 84. He was formerly Secretary of Leamington Priors Gas Company, in whose service he was for more than 60 years. Mr. Hems went to Leamington in 1874, and in the following year entered the Gas Company's office as a junior clerk. In 1913 he was appointed Secretary, a position he held until shortly before the outbreak of the recent war, when he entered upon retirement.

* * *

The death has taken place of Mr. C. L. GODWIN, of Newport Pagnell. Mr. Godwin took up the appointment of Manager and Secretary to the Newport Pagnell Gas Company in 1929—a position he retained until the Company was acquired by the Northampton Gaslight Company in 1937. At that time he went into retirement, but during the war years he had been assisting the latter Company at their Northampton offices. Prior to going to Newport Pagnell he was Assistant Works Manager to the Bishops Stortford undertaking, and then, in 1916, joined the Woodbridge Gas Company as Engineer and Secretary. He remained with that Company until it was taken over by the Ipswich undertaking.

Diary

Nov. 2.—London Juniors: Meeting at Gas Industry House. Paper by J. F. Waight, "Applications of 'Neat' Gas in Industry."

Nov. 10.—Yorkshire Junior Gas Association: Britannia House, Bradford, 2.30 p.m. Paper, "Two Fuel Industry," by A. Cole.

Nov. 12.—Women's Gas Council: Executive Committee, 12.45 p.m., Gas Industry House.

Nov. 13.—National Federation of Gas Coke Associations: General Committee, 10.30 a.m., Gas Industry House.

Nov. 13.—Institution of Chemical Engineers—the Chemical Engineering Group: Joint meeting, Burlington House, 5.30 p.m. Paper, "Some Practical Aspects of Large-scale Gas Distribution, with Particular Reference to Steelworks," E. Hemingway Jones.

Nov. 14.—B.G.C.: Gas Industry House, 2.15 p.m.

Nov. 27–28.—Institution of Gas Engineers: Autumn Research Meeting.

Dec. 6.—Town and Country Planning Association: Lunch-time meeting, 28, King Street, Covent Garden, W.C. 2. Talk and discussion on "Heating the Family Home."

North Western Fuel Luncheon Club

The inaugural luncheon meeting of the North Western Fuel Luncheon Club on Oct. 3 was a great success, and was attended by 130 members and guests. Sir Frederick J. West, President, outlined the main objects of the Club; Mr. Gordon Macdonald, North Western Regional Controller, Ministry of Fuel and Power, dealt with the present fuel situation; and Mr. M. K. Burrows, Vice-President, spoke on coal production from the technical and commercial viewpoints.

The toast of the guests was proposed by Mr. R. A. S. Thwaites, Vice-President, and responded to by Dr. E. W. Smith, President of the Institute of Fuel.

The next meeting is at the Engineers' Club, Albert Square, Manchester, on Nov. 7, when Professor P. M. S. Blackett, F.R.S., will speak on "Atomic Energy."

Technical and Scientific Register

For the special benefit of demobilized men and returned prisoners of war who are scientists, professional engineers, architects or surveyors, the Ministry of Labour and National Service have asked us to invite attention to the service provided by their Appointments Department's Technical and Scientific Register at York House, Kingsway, London, W.C. 2—Telephone TEMple Bar 8020. A technical staff, competent to give advice and assistance, has been augmented to meet problems of settlement and reconstruction. A large variety of vacancies, both at home and overseas, is now available for fully qualified scientists, engineers, &c. Enquirers are particularly asked to write or 'phone for appointments, stating occupation, qualifications, and the purpose of the proposed visit, so that they will not be kept waiting when they call.

Southern Association

(Eastern District)

The Southern Association of Gas Engineers and Managers (Eastern District) held its first post-war meeting at Gas Industry House on Oct. 23, when Mr. F. Dawson, who had been Chairman for the 18 months ended last June, inducted his successor, Mr. G. L. Braidwood. On the proposition of Mr. F. M. Birks, seconded by Mr. J. W. Townsend, Mr. Dawson was heartily thanked for his past services.

Mr. BRAIDWOOD gave a brief review of the wartime activities of the Eastern District. All meetings were cancelled when the war started, but as the result of a Committee meeting in January, 1940, meetings were held in February, March, and April, 1940, the May meeting being cancelled because of the international situation. Then came the blitz period, and apart from a Committee meeting in November, 1941, there were no further activities until January, 1942, when a Paper was read, appropriately, on "War Damage to Gas-Works." That was followed by further meetings in February and April, and in May of that year the Committee decided to invite the Press to the District meetings. Until that time their meetings had been private, and his own view was that the change was well worth while, because although there might be something to be said in favour of freer discussion if the Press were not present, any such advantage was outweighed by the fact that the usefulness of the Association should be shared in the true tradition of the Gas Industry by the Industry at large. Meetings then continued from October, 1942, to June, 1943, and were resumed in October. In November the Committee decided to admit a representative of the London and Southern District Junior Gas Association to the Eastern District meetings, without power to vote. Further meetings were held in February, March, April, and May, 1944, and again from November, 1944, to March, 1945. To summarize, they had lost two complete sessions, or slightly more, during the six years of war.

The standard of Papers had never been higher than during the war years, and the attendances had been appreciably greater. A tradition had developed in the last few years that a Paper should be included in each session which was not in the usual run of technical subjects, but rather of indirect interest. They had had, for example, Papers on the Beveridge Report, Plastics, and Industrial Psychology, and he hoped to follow that tradition by introducing early in the New Year a Paper on the extremely important subject of Education and its relation to the Gas Industry. Two of their highest attendances were for the Papers on War Damage and Safety Rules, and it seemed therefore that the subject of self-preservation had been of paramount interest to members, which was perhaps only natural in the period they had been through. Those record attendances were closely followed by the attendances for the Paper on Plastics, and for the very interesting Paper presented by Mr. C. H. Chester.

His second subject was that of the Education Committee. An Education Committee had been elected by the Eastern District for some years, but he regretted to say it had never met. Education being of such vital importance to the Industry, the Committee felt it was high time it took some active participation. A new Committee had been elected, and would meet together with a Committee from the London Juniors in the near future and get down to business.

Another point he wished to mention was that it had been decided to make the election of members of the Committee more democratic. A Sub-Committee had been set up to look into the alteration of rules of the main Association, and until that Sub-Committee had decided what measures should be taken nothing concrete could be done. In that connexion, however, he wanted to draw attention to an Editorial in the "JOURNAL" of June 20, referring to the election of the Executive Board of the British Gas Council and emphasizing the desirability of every district being directly represented. At the end it said: "In the long run success depends more than anything else upon organization in the districts. There can be no magic formulae devised at Gas Industry House to solve at one stroke the problems of the Sheffield steel furnace and the boarding-house keeper at Brightlingsea. Yet there is obviously need for a co-ordinating body which can speak representatively for the whole Industry in matters of policy on the national level—a clearing-house for views of all the districts in such matters. Are the districts really and truly setting their houses in order? We have so often in the past complained of the veil of secrecy which appeared to surround proceedings at headquarters—an obstacle to confidence and progress which we believe will be removed by the new set-up. Is there any counterpart of it in the districts? Are their organizations truly democratic, truly representative of the small as well as of the big fry, and are the rank and file given every opportunity of making their opinions heard?"

Prior to the date of that editorial, the District Committee had decided that the time was ripe for a more democratic election of members of the Committee which, as members knew, had always been elected by the Committee itself. Although the matter would not be on the agenda until the next meeting, he felt it desirable to indicate to members that it was their desire that in future the members themselves should put forward nominations, so that there would be every opportunity for them to be fully represented on the Committee of the Association.

Mr. L. MUIR WILSON (South Metropolitan Gas Company) read a Paper on "The Stability of Heated Structures"—see p. 602.

Coke Oven Managers' Association

Annual Luncheon

The Annual Luncheon of the Coke Oven Managers' Association followed the Annual General Meeting, at the Waldorf Hotel, London, on Oct. 25. The PRESIDENT (Mr. W. Neville Warwick) was in the chair. The Principal Guest was Sir John M. Duncanson (British Iron and Steel Federation); his fellow guests included the Rt. Hon. Wilfred Paling, P.C., M.P. (Minister of Pensions), Mr. Hugh Griffiths (President, Institution of Chemical Engineers), Mr. A. Edwards, M.P., and Mr. W. H. Oldfield, M.P.

Dr. A. H. MIDDLETON proposed "Our Guests."

The Rt. Hon. WILFRED PALING said he was glad to be present, having taken a great interest in the Association for many years. He had been interested in the coal mining industry since his boyhood, and had seen the coking industry grow almost as rapidly as any industry in this country had grown, and it had proceeded, as much as any industry he knew, in accord with scientific knowledge. Coal was a wasting asset, and they could not do better than use it as carefully, as scientifically, and as efficiently as possible, not only in the interests of their own generation, but also in the interests of those to come. The coking industry had contributed in large measure towards making them all realize what a valuable asset they had in coal. The industry was dealing with about 25 million tons a year. Those concerned with coking had given of their best, and thereby had rendered great service to the community in general. He wished all success to the Association.

Mr. HUGH GRIFFITHS, who also responded, said it was hardly necessary to remind the gathering that the relations between the Coke Oven Managers' Association and the Institution of Chemical Engineers must be professionally very close; he had observed, from the list of Officers of the Association, that quite a number of members of the Institution were members of the Association also, and he felt, too, that coke oven practice could benefit from the application of chemical engineering technique.

Sir JOHN DUNCANSON, proposing "The Coke Oven Managers' Association," said the opportunity to speak to the members of the Association was something very dear to his heart, because everything behoved the steel industry and the coking industry to be closely associated together in those happy links which had prevailed in the past and which he was sure would prevail in the future. The coke oven industry had been vital to this country, and Sir John paid tribute to its magnificent work during the terrible years of war. He knew something of the circumstances in those dark days, when new problems had to be faced every day in connexion with the production of vital products. Both the steel industry and the coking industry had suffered through the war years, apart from the shortage of labour and materials, from the fact that they had set out to make their contributions by achieving the highest possible output, and they had achieved that. But now they must address themselves immediately to making good the repair and maintenance which were so essential if the two industries were to maintain the pace; the highest possible output was still called for. They must review their production and do the maintenance work which would have been done during the war years had it been possible; and at the same time they must see to the expansion of production which was necessary in order to meet the future needs of the country. Perhaps the most important matter was that they should continue to address themselves to scientific development. If he were asked what the plans of the coking industry in that direction should be in the future, he would say that they would concentrate more especially on planning to provide the fuels most appropriate for the regions in which they were prepared, that they would concentrate on the manufacture of a suitable domestic solid fuel from coke ovens, and that they would pay increasing attention to the production of many synthetic products from their gas.

The PRESIDENT, in his response to the toast, said the Coke Oven Managers' Association was available to offer technical co-operation, and assist to develop to the fullest extent any opportunities for the expansion of the steel or coking industries. The war had proved the real advantages to be gained from research. The dividends were those remarkable inventions which had accelerated its victorious conclusion.

Members of the Institution of Gas Engineers will be welcome at a Joint Meeting of the Chemical Engineering Group and the Institution of Chemical Engineers, which is to be held on Nov. 13, 1945, at 5.30 p.m. in the Apartments of the Geological Society, Burlington House, Piccadilly, W. 1, when a Paper entitled "Some Practical Aspects of Large-Scale Gas Distribution, with Particular Reference to Steelworks," will be presented by Mr. E. Hemingway Jones.

The Engineering Industries Association has brought to the notice of the Government the serious position facing large sections of the industry mainly in consequence of the incidence of present industrial taxation. It advocates a new conception of industrial taxation, and the setting up of a Commission with wide powers of reference to review the taxation system in the light of recent experience and present-day requirements.

Pudsey Gas Company, one of the West Riding Group of Gas Companies, celebrated its centenary with a dinner on Oct. 23.

Institution of Gas Engineers

The Council of the Institution of Gas Engineers met at Bournemouth on Oct. 16, and after the meeting inspected the experimental work of the Gas Research Board in progress at the Pitwines Works of the Bournemouth Gas and Water Company.

The death of Sir David Milne-Watson, Bt., an Honorary Member, and five Members of the Institution, including Mr. George Dixon (Nottingham), a Past President, and Mr. L. F. McLeod (London), a member of the Meters and Pipes Committees, was reported with regret.

A report was made of the work of the following Technical Committees: (*a*) Chairmen's Technical Committee: The 6th Report of the Chairmen's Technical Committee, 1944–45, incorporating sections dealing with the work of the various Technical Committees of the Institution, was approved for presentation and discussion at the 11th Autumn Research Meeting. (*b*) Joint Lighting Committee. (*c*) Meters Committee. (*d*) Liquor Effluents and Ammonia Committee. (*e*) Co-ordinating Committee of Gas Engineering Advisory Boards: A report was made of a recent meeting of the Committee attended by the Director of the Gas and Electricity Division of the Ministry of Fuel and Power and members of his staff.

A report was made of recent meetings of the Gas Education Committee and the Board of Examiners.

It was resolved, on the recommendation of the Arthur Duckham Memorial Fund Committee, that the Third Arthur Duckham Research Fellowship be awarded to Dr. J. K. Kilham (Leeds). The Fellow will carry out an investigation of energy transfer from flame gases to solids in contact therewith at the University of Leeds.

The Chairman of the Council of the Gas Research Board reported on the current activities of the Board.

Further consideration was given to arrangements for the 11th Autumn Research Meeting to be held in London on Nov. 27 and 28.

It was reported that, in response to an invitation from the Secretary of the newly-formed Scottish Engineering Students' Association to the Institution of Gas Engineers to nominate a representative, under the age of 30, to serve on the Council of the Association, Mr. J. H. Fulton (Dumbarton) had been appointed to represent the Institution in this capacity.

The President (Colonel C. M. Croft) reported that, by arrangement with the Secretary of the Public Schools Employment Bureau, a party of Headmasters and/or Careers Masters of Public Schools would be visiting the Wandsworth and District Gas Company on Oct. 17.

It was reported that the National Smoke Abatement Society was organizing conferences in the near future in London, Southampton, and Manchester.

A report was made of the work of the Gas Consultative Panel of the Allied Control Commission for Germany, with particular reference to installations in Germany which had been recommended for early inspection.

It was agreed that the President and Secretary should discuss with representatives of the French Gas Association and with the Secretary of the International Gas Union (Colonel H. Zollikofer, Switzerland) the question of reviving the International Gas Union.

Town Planning and District Heating

In a talk on "Town Planning and District Heating" to the Town and Country Planning Association in London on Oct. 25, Mr. Donald V. H. Smith stated that in one district heating scheme serving 1,300 houses and a number of public buildings the cost of all the basic heat required, plus hot water on tap, worked out at 4s. 7d. per week per house, or just under £12 a year. In a scheme serving 130 houses the cost was from 3s. 9d. to 4s. a week, and in another scheme serving 600–700 flats, with a communal laundry attached, the cost, allowing for the supply of from 380 to 420 therms per house, which was more than the average householder obtained, ranged from 2s. 8d. per week for a two-roomed flat to a little over 4s. for a four-roomed flat.

On a large industrial estate in Scotland where district heating had been in operation for some years, the average cost per house over the period from 1920 to 1945 was only 3s. 3½d. per week. The outstanding advantages of district heating were smoke abatement, fuel economy, and saving of domestic labour, and in view of the present fuel situation and the fact that gas and electricity alone were not likely to be able to cope with the demand for heat, he urged that district heating should form a definite part of the future housing programme. The capital cost might be a little more, but whereas the tenant of a house costing £800 would probably spend from £14 to £20 a year on fuel, the tenant of an identical house district-heated and costing £850 would only need to spend from £10 to £14 a year on his heat requirements.

In the course of a discussion, Mr. Smith said he would not advocate the introduction of district heating in older houses. He admitted that a few unscrupulous people might waste hot water, but the advantages of charging a flat rate would outweigh any benefit to be derived from metering the supply. Large numbers of district heating schemes were in operation on the Continent, particularly in Russia, and some of the houses served were two miles or more from the central heating station. There were inevitably some slight temperature losses, but on one of the longest systems in this country he had found that the return temperature was only 4° below that at the beginning of the circuit. The 1,300 house system to which he had referred served houses spaced at from 10 to 12 to the acre on a long narrow estate about a mile in length. He admitted that he liked his own fire to supplement the background heating, which was very cheap, and he saw no reason why a tenant should not have all the pleasurable heat he wanted by deriving his main heat supply from the district system and consuming from 18 to 25 cwt. of fuel for his favourite fire, as against consuming from three to five and a half tons of fuel in the old-fashioned way.

Imperial College Centenary

The King and Queen attended the chief event in the centenary celebrations of the Imperial College of Science and Technology at the Royal Albert Hall on Thursday last. The occasion was one of colourful spectacle, those holding various degrees of learning being adorned in appropriate hue. More than 5,000 greeted their Majesties with vociferous, infectious enthusiasm. Lord Rayleigh, Chairman of the Executive Committee of the College, delivered a speech of welcome, and this was followed by the King's reply, which was broadcast.

The King, in the course of his reply, recalled the interest taken by his family, not only in the Imperial College since its foundation in the reign of King Edward VII, but in its three constituent colleges ever since the beginnings. He continued: "The Royal College of Chemistry, in its inception in 1845, had as its President my great-grandfather, Prince Albert (later Prince Consort), and he gained for science and the arts that great site on which, with other institutions, the Imperial College now stands. . . . I know that the success of our D-Day invasion was in great part due to engineers trained in your City and Guilds College, and I know, moreover, that Imperial College has contributed to victory not only by research but by its training of men who go from it to all parts of my Empire.

"The achievements of British science and technology during these last years of total war have been outstanding. With relatively limited resources—and these strained to the uttermost—we may nevertheless claim to have outmatched our enemies in every vital respect. What has been accomplished not only fills our hearts with justifiable pride, but should be a great source of encouragement to the whole nation in facing the hard tasks that now lie immediately ahead. The same vigour, ingenuity, and skill that have brought us to victory must be engaged in ever-increasing measure in the work of recontruction.

"At the same time our ardour must be tinged with apprehension when we reflect upon the potency of the instruments which new developments in the realm of science are placing at the disposal of the human race. The employment of atomic energy for the first time under the stress of war may well mark the beginning of a new era of scientific discovery. Of the results that may follow in the course of time no one can speak with confidence. The possibilities seem limitless—of vast material benefit to all mankind on the one hand, or, on the other hand, of destruction on a scale hitherto undreamt of. We must all pray that wisdom may be vouchsafed to the statesmen of the world so that means may be found, ere it is too late, of ensuring that the new knowledge recently gained is used solely for the promotion of peace and the raising of standards of life in all parts of the world."

Mr. R. V. SOUTHWELL, the Rector, expressed the thanks of the staff and students to the King.

The Future Coventry

The Corporation of Coventry, one of the most heavily bombed cities in Great Britain, has recently celebrated the success of our armed forces and commemorated the 600th anniversary of the granting of the Charter of Incorporation to the town by holding an exhibition illustrating some of the proposals and suggestions for the physical reconstruction and planning of the city. The models, plans, and drawings did not necessarily present policies which had been adopted by the City Council, but were intended to arouse interest among the citizens in seeing that the future Coventry is worthy of its tradition and the sacrifices of its people. As a permanent record of the occasion, the Corporation has published a handsome non-technical illustrated booklet, *The Future of Coventry*, setting out in detail the problems that have to be solved and some of the suggested means of solving them. By way of contrast to the maps of future development there is a reproduction of a map discovered recently on an enemy aerodrome near Berlin. It is a plan for the destruction of Coventry, prepared with typical German thoroughness, indicating especially the gas-works, electricity works, war factories, and other selected targets.

The Gas Supply Company, Melbourne, has declared a dividend of 4½% for the year ended June 30, compared with 4% for the previous year. The profit was £15,096, against £13,823, and £1,812 is carried forward against £1,674 brought in. Gas sales increased by 6.3%. New carbonizing plant was completed during the year at Cairns, Albury, and Sale, and several additions to plant were made at other branches. A contributory provident scheme has been established, all employees with over a year's service being eligible, subject to approval by the Company.

A Consumer Investigation

In the course of his Presidential Address to the Scottish Junior Gas Association (Eastern District), Mr. J. R. Denoon, Edinburgh, gave an account of an investigation, carried out in Edinburgh, to obtain details of the consumption of the average domestic consumer. Such information is necessary to calculate the probable load which will be imposed by new housing estates, to ensure that an adequate supply of gas is available.

It was decided to carry out tests on two groups of consumers—*viz.*:

(*a*) Those inhabiting low cost "owner-occupier" houses which were taken as being typical of the type of house which would be erected for private sale in the post-war years.

(*b*) Those occupying a Corporation tenement scheme, which was taken as a prototype of rented post-war houses.

The first problem which arose was that of measuring the flow of gas to these groups of consumers, and after much thought and discussion it was decided that a normal type of dry meter should be used so that there should be no question regarding the accuracy of determination.

A 4,500 H.C. meter was available, and suitable connexions were made to enable the gas supply of the selected groups to be diverted through this meter. It was decided that readings should be taken during summer and winter periods in order to obtain the seasonal variation in the domestic load.

A house-to-house survey was carried out to obtain data regarding the occupants of the houses and the appliances fitted. Five-minute readings of consumptions were taken over 24 hours, so that accurate determination of the fluctuations in load could be obtained.

The accompanying data give the principal results obtained:

CORPORATION HOUSING SCHEME—TENEMENT TYPE.

		%
Total number of houses included in test	288	100
Houses with no gas appliances	2	0.7
„ unoccupied on date of consumpt test	12	4.2
„ with gas cookers	286	99.0
	(40 HG)	(13.9)
„ with gas washboilers	—	—
„ with gas fire	7	2.4
„ with gas poker	4	1.4
„ with gas iron	23	8.0
„ with gas ring	1	0.3
„ with electric cooker	*Nil*	*Nil*
„ with electric fire	57	19.8
„ with electric iron	63	21.9

The 286 houses were inhabited by a total of 1,406 occupants, of whom 655 were under 14 years of age. 171 persons normally take lunch away from home (12.2%).

Population/House ratio .. .. 4.9/1.

	Summer.	Winter.
Rated connected load	27,165 cu.ft.	27,165 cu.ft.
Diversity (consumer)	1/9.1	1/9.7
Rated connected load/consumer (286)	95 cu.ft./hr.	95 cu.ft./hr.
Max. hourly rate/consumer	10.5 cu.ft.	9.8 cu.ft.
„ „ rate/head of population	2.1 cu.ft.	2.0 „
Daily consumpt/consumer	95 cu.ft.	90.8 „
„ consumpt/head of population	19.3 cu.ft.	18.5 „

HOUSING ESTATE—FLATTED VILLA TYPE.

		%
Total number of houses included in test	140	100
Houses with no gas supply	6	4.3
„ unoccupied on date of consumpt test	26	18.6
„ with gas cooker fitted	134	95.7
„ with gas washboiler fitted	11	7.9
„ with gas fire fitted	2	1.4
„ with gas poker fitted	62	44.3
„ with gas iron fitted	7	5.0
„ with electric cooker fitted	6	4.3
„ with electric fire fitted	135	96.5
„ with electric iron fitted	87	62.2
„ with electric immersion heater	2	1.4

The 140 houses were inhabited by a total of 383 occupants, of whom 92 were under 14 years of age. 68 persons normally take lunch away from home (17.8%).

Population/house ratio .. .. 2.75/1.

	Summer.	Winter.
Rated connected load	17,355 cu.ft./hr.	17,355 cu.ft./hr.
Diversity (consumer)	1/14.8	1/13.2
Rated connected load/consumer	129 cu.ft./hr.	129 cu.ft./hr.
Max. hourly rate/consumer	8.75 cu.ft.	9.9 cu.ft.
„ „ rate/head of population	3.1 „	3.5 „
Daily consumpt/consumer	45.8 „	63.4 „
„ consumpt/head of population	16.0 „	22.2 „

Gas Industry in China

The Directors of the Hong Kong and China Gas Company announce that the gas-works in Hong Kong and Kowloon are again in the Company's hands, after having been under Japanese control since the Colony was occupied on Dec. 25, 1941. A preliminary report has been received from the Resident Engineer and Manager on the European Staff, who were interned in Stanley Camp, and on the condition of the works and plant. All members of the European Staff, with one exception, were interned in Stanley Camp, where they suffered considerably from malnutrition. The official who was not interned with the others was later imprisoned and was subjected to torture and great hardships. They are, however, now able to assist on the works, and their health is gradually improving under treatment and improved diet. All the staff have been medically examined by Naval doctors, and arrangements are being made for them to return home as early as possible.

The Hong Kong Works have not been in operation for over a year, due to lack of coal; all the plant is intact, but is in a bad state of repair, due to neglect, and much maintenance work will have to be done. The Kowloon Works have been shut down for about three months, due also to lack of coal. The plant here is also intact and is in a fairly good state of repair, more attention having been paid to maintenance since it was shut down.

Gasholders generally appear to be in a good condition. One holder suffered extensive damage during the war due to a bomb which fell about 50 ft. away. The Japanese repaired the damage and the holder has since been in use. Another holder received two direct hits by small shells and repairs were effected by the staff. It is proposed to carry out an internal examination of all gasholders.

There is a considerable amount of work to do in repairing mains damaged during the heavy bombing which occurred after the suspension of the gas supply, and a thorough examination of all mains in Hong Kong and Kowloon will, of course, take some considerable time. A large number of cast-iron lamp posts have been removed from Hong Kong; these have been snapped off at the base and no attempt made to cap off the service pipes. Most of the Littleton lamps have disappeared, so at the moment there are no street lighting facilities. At Kowloon all street lamp posts are in position, but here also the Littleton lamps have disappeared.

One of the main difficulties at the present time is obtaining sufficient staff to carry out the necessary repairs; about 60% of the old Chinese staff have died during the Japanese occupation, chiefly of starvation, and bricklayers and works fitters are extremely difficult to obtain. Every endeavour is being made to send a relief European staff to Hong Kong as early as possible to enable those members who have been interned to leave the Colony. The Engineer and General Manager, Mr. H. E. Stone, has arrived in Hong Kong. It is not possible to say how soon a gas supply will be available.

This lorry took part in the parades in connexion with the Birmingham Thanksgiving Savings Week. On it were exhibited some of the articles produced by the Parkinson Stove Company, Ltd., during the war, and a modern type cooker for building-in for peacetime requirements.

The Directors of Associated Gas and Water Undertakings Ltd. have declared an interim dividend on the Ordinary Stock of 2½% actual, less tax; and an interim dividend on the deferred stock of 3% actual, less tax, on account of the year ending March 31, 1946; payable Nov. 30, 1945. Both dividends are the same as paid last year.

Representative Workers in the Scottish Gas Industry were included in the Victory parade at Edinburgh on Sept. 26, at which the King took the salute. The parade, numbering nearly 5,500, was representative of the fighting services, war industries, civil defence, public utilities, and agriculture, all of which played a part in winning the war.

Coke Oven Managers' Association

Presidential Address

of

W. NEVILLE WARWICK

Manager of the Coke Oven Plant of the South Durham Steel and Iron Company, West Hartlepool and Middlesbrough

THE personnel of the Coke Oven Managers' Association have worked vigorously through the war years under difficulties; they deserve great commendation for their sterling work. General shortage of experienced labour caused problems of an unprecedented character at a time when increased production and closer scientific control of analytical detail had to be given equal attention. The burdens were made heavier by the need for parsimonious renewal expenditure, a critical dissection of operating costs, statistical control, and enforced utilization of classes of coal not in conformity with normal practice.

On the metallurgical side we supplied miscellaneous industries with fuel in the form of gas and coke to give substantial impetus to the production of armaments, and at the same time the demand for domestic coke increased to implement inadequate coal supplies. Nitration quality toluene and pure benzole became products of greater importance than the motor benzole, xylole, and solvent naphthas produced in normal times. Our sulphate of ammonia production subscribed its share to the success of the nation's agricultural achievement, whilst our tar distillation plants produced products of paramount importance to various war industries.

To be efficient, uninterrupted continuity of operations is essential with our processes, and I feel that coke oven supervisory staffs have kept up a winning pace in an orderly and systematic manner. Coal carbonization is an applied science that needs encouragement, so that it can develop scientifically in order ultimately to process coal resources to the best national advantage. The skill with which coke oven staffs have conducted the arduous duties imposed upon them during the war clearly indicates that these enthusiasts merit wider recognition in post-war years.

Wartime experience will prove invaluable as we plan to advance our practice. It is quite evident that designers and technicians, when concerned in mechanization toward increase in tonnage output per man, might also profitably study means for conservation of the present dwindling manpower in heavy industry. The war has taught us the value of experienced and tolerant men. If it had not been for a particular category of loyal worker, serious production stoppages would undoubtedly have occurred as suitable replacement labour was unobtainable.

There are still operations in our practice where the physical effort required to do the job effectively causes unnecessary fatigue under the hot conditions prevailing on a coke oven plant. Although there are complex technical problems to solve, it should be possible by industrial research to mechanize many more operations and improve the working conditions generally.

The Question of Amenities

On surveying design development since 1928, it is observed that after the introduction of American and Continental designs to increase productivity of the coke oven, production specialists have concentrated insufficient effort to protect the operator from the more uncomfortable features of the coking process. I note that the Kharkov Institute of Scientific Research for the Protection of Labour have for some time engaged themselves upon numerous problems toward more congenial employment on coke ovens. They have surveyed those duties which cause exhaustion and frequently oven damage through neglect because the tasks are unpleasant. Increased frequency of operations calls for closer attention to the working conditions, and there is scope for technological ingenuity in the direction named. Such study would also increase plant efficiency.

We know that the public is now more readily disposed toward the use of carbonized fuels; the change is more persistent since the development of efficient coke-burning appliances together with the necessity for nation wide reduction in consumption of raw coal on open fires. We can, therefore, visualize an increasingly substantial contribution toward a smokeless country by wider use of the fuel provided by the Coking Industry. There is scope for enormous development of solid smokeless fuels in general industrial and domestic markets at home and abroad; success will be assured if there is co-ordination in production, selling, and utilization.

We learn that the Chief Inspector of Alkali Works Dept. of the Ministry of Health continues to view the escape of green gas during the charging of coke ovens with concern, especially as there is a general tendency to enlarge plants and locate these in the more densely populated areas. Smoke pollution is a problem to which we will be expected to give some attention. On the older plants, a reduction in the time required for charging ovens is the obvious and probably the only major improvement which can be expected. To a large extent this will depend on close team work among the coke oven operators and supervisors. With the more mechanized ovens, provision is usually made for increasing the suction on an oven during charging and for automatically controlling the pressure in the collecting main, so that presumably a larger proportion of the gas evolved is drawn into the main. On the other hand, marked increase in the size of ovens and in the rate of carbonization tends to increase the amount and frequency of green gas emissions, in spite of increased speed in charging. The shape of the by-product oven is not ideal for effective draughting; a reduction in gas escapes will depend on the maintenance of an unobstructed free space in the oven top during charging, reduction to a minimum of the number of points at which gas can escape to atmosphere, and the application of sufficient suction to draw all gas to the ascension pipe or pipes.

Improvements in Charging

The first condition is determined by the success or otherwise in charging the coal into the oven without the formation of peaks which form barriers to the passage of gas along the top, and improvement in this respect will depend on future design of the coal charging car and the technique of the operators. Improvements in the design of charge hole lids to facilitate replacement immediately the corresponding coal larry hopper is emptied would lead to a reduction in the number of escape points, but it seems open to question whether it would be better to provide more charge holes in order to produce faster and better distribution of the entering coal, or to have fewer charge holes in order to reduce the number of points at which gas can escape. The use of two short ascension pipes, the Beimann main, and similar devices, are definite advances in practice, but these could be made more effective by the development of still more sensitive pressure controllers for the collecting main and gas exhausters. Present standard devices for increasing suction on individual ovens by means of a steam jet could also be improved, as the present design tends to pull fine coal into the gas main, with consequent deterioration in quality of tar, and create disturbances in the operation of the plant.

In regard to the general design of the coke oven, there has been no great departure from pre-war practice, as the time has been inopportune for radical changes. Coke oven technicians do know that present performance of the auxiliaries is not good enough, and it seems we should foster deviation from the design that was considered fairly efficient up to the year 1938. We have had cause to lament the lack of flexibility and hard wearing propensities of equipment on modern ovens, especially evident when the ovens pass a life of 13 years. Now is the time for another step forward. It seems that this country followed rather blindly those designs giving satisfaction on comparatively new foreign plants. When becoming inefficient by age foreign operators renew their plants on a grandiose scale, whereas in this country the tendency is to make ovens give a protracted life, with consequent fall in efficiencies, this being an inherent characteristic of English outlook in spite of some 15 years' observance of enlightened practice in other countries. It is evident that plant will have to be more robust if we continue with such a policy, and expect to keep national production costs on a competitive level.

Increased Standards of Efficiency

If industrial progress is to continue, standards of efficiency will increase, and specifications of products may become more severe to suit special manufacturing conditions in new trades. Development in other industries may eventually call for something near a non-variable metallurgical coke, and such a consistent product could hardly be made economically with the type of equipment operated to-day; new methods are required. Observe that there is a spate of new tests being discovered by consumers for expressing degree of quality of coke. It should not be an insuperable matter to eradicate the cause of the vexed periodic variation in appearance of coke when all known features of carbonizing are stable. Coal variation is the most important single factor, and I feel that our present system is too casual for a material which can no longer be considered cheap and plentiful. If it is not economical to keep coa lseams separate, the solution may be eventually to commence classification from the coal face and conduct preliminary blending at the colliery, as we have learnt the proportions of coal from the different seams making up a day's coal output varies, and thus the blending programme at the coke ovens often works out wrong in consequence. The tonnage from the better coking coal seams is diminishing and quality is deteriorating. Partly to combat this we have resorted to more intensive washing and blending. A progressive policy would be to arrange effective co-ordination between colliery and coke oven technicians in a similar manner to the collaboration that is becoming established between coke oven and blast furnace operatives. There are great potentialities for changes in design of coal preparation equipment to maintain the standard of coke quality being set to-day, which has to be made from coals varying chemically and in agglutinating power. If specifications do become more stringent, then I can envisage a very busy time ahead

for us all, as we will require a great extension of truly flexible yet balanced plant to make various types of coke. We will require appropriate equipment for more thorough conditioning of coals, more advanced laboratory control and carbonizing technique, together with more scientific attention to the finishing processes for our products.

The problem is very complex, since if a plant is found to make a precision quality of metallurgical or special coke, it is also desirable that it should control closely the quality and yield of gas, tar, sulphate, benzole, and the miscellaneous derivatives attached thereto, which are all released initially under the same circumstances.

Tar Distillation

Prior to the war our industry was satisfied with working up comparatively few by-products, such as ammonia, tar and benzole, to which sulphur may be added, where we had been compelled to remove it from the gas. There are exceptional cases, but generally the distillation of tar has been carried out in a somewhat haphazard manner, thereby losing the potential markets for the separate compounds it contains. The stagnation in scientific enterprise and satisfaction to produce only a few pecuniary by-products has been partly removed by the war demand for Pures. Thus the question of closer fractionation was revived, both for crude benzole and the continuous fractional distillation of tar. Sufficient experience has already been gained in new procedure, which might well have a revolutionary effect on the old wasteful methods and systems of refining. Having now started, it is my belief that with Government interest and financial help we could go much further in the erection of ancillary plant to work in conjunction with our existing coke plants for the production of those organic chemicals so vital to the vast expanding synthetic trades. By so doing we would be helping to make our country more self-sufficient by substitution, and perhaps also provide profitable indigenous products for export. With the tendency to centralize the tar industry groups have been formed sufficiently large to warrant the installation of extensive continuous fractionation plant, and the ultimate passing of the comparatively inefficient batch still seems assured. Such modernized plant, coupled with new refining methods, is already enabling us to isolate many more of the individual components from our tar, and we have every reason to be confident that with proper organized research we will find the necessary new applications for these materials. We must see to it that new plant in this industryr is expanded still further, and not be allowed to retreat into redundancy as it did after the last war.

Renewed attention is being focused on the subject of chemical utilization and production of organic compounds from coke oven gas. Evidence of passing beyond the theoretical stage is shown by the active consideration being given to ethylene extraction, and the initiative of firms who are installing specialized plant. With the technical brain power at this country's disposal we might organize ourselves and work alongside the American petroleum industry to some advantage. It is for us to decide now if we intend to stop at ethylene recovery, or go a stage further to the partial separation of methane. Is the total fractional separation of all the constituents by means of liquefaction too ambitious, at this stage? If this is so, it is still necessary for us to keep the subject under active review when building or modernizing recovery plant. It is advisable to prepare for the possible inclusion of such plant at a later date. Adsorption of benzole by active carbon may become a better proposition in the light of these possible developments. The economic removal of sulphur by wet methods is of paramount importance in fostering the new chemical industry, and its recovery might well form the nucleus in this era of synthetic organic chemical production. The fullest utilization of our raw materials is of the greatest importance in view of the changed financial position of the country.

Power Alcohol

It is common opinion that the accepted recommendation of the May report to remove the 5d. Treasury allowance on industrial and power alcohol produced by fermentation will tend to favour alternative methods for its production. In the case of extracting ethylene from coke oven gas it is thought that ultimately alcohol will not be the object in view, but rather the production of the more remunerative bodies, of which fifty are possible—*e.g.*, vinyl chloride, ethylene dichloride, ethylene glycol, &c. The possible production of alcohol and its vast expanding demand does make the proposition more promising. Initial concentration of the ethylene in gas is of prime importance to the economic production of any synthetic chemical, and the concentration in coke oven gas must be considered low compared with gases from other sources now being produced in the country, such as cracked petroleum gas and those obtained via hydrogenation and cracking. Of the various methods of recovery, direct adsorption in solvents, in chemicals with which it reacts, liquefaction or carbon adsorption, the latter two seem more applicable, due to the necessity for initial concentration. The carbon adsorption process can produce ethylene some 96.5% pure, but if it is our desire to go further than producing liquid ethylene, then we would do well to consider liquefaction, as this makes itself attractive in that we can have as well as ethylene a partial separation of the methane. The Gas Industry, through the Gas Research Board, is already showing a keen interest in these developments, and this is pre-eminently a subject in which we might work closely with them.

The production of oil from coal is not the live question it was before the war, and we should determine, not whether we can produce oil by expensive chemical processes more cheaply than it can be persuaded to flow out of the ground, but whether there are not more far-reaching advantages to be gained by home production. The cost at present is higher than that of imported oil, but there are valuable ancillary industries based on the hydrocarbons obtained by the Fischer-Tropsch and similar processes. We have hitherto allowed the one time Axis Powers to develop this process entirely; and while I do not advocate that we should immediately plan to produce the bulk of our oil requirements from coal by this process or by hydrogenation, I would ask whether the time has not come when this country should build two or three such plants in order that profitable possibilities or wider application in these processes can be studied. It may well be that in addition to producing oils as a by-product, we could build up an organic chemical industry upon the Fischer-Tropsch reactions.

We do appreciate that large scale production of oil from coal by any process is not an operation that can be undertaken as an adjunct to a coking plant. The expenditure entailed and the possibilities for expansion are so great that the coking plant is more likely to be the adjunct to the oil plant.

The Technical Press

The support given to industry by the Technical Press has been an important feature of the war years. At a time when it has often been difficult to attend conferences near at hand, and impossible to do so when the meetings were far away, articles and reports have contributed in no small measure towards keeping us all informed of new procedure and developments so far as publication was permitted by the censors. The Technical Press has also functioned under difficulties. Published for the most part in London, the papers have been written and produced with the handicaps of enemy interference from planes, flying bombs and rockets, shortage of paper and staff, together with the requirements of censorship. The leading articles, written away from the daily routine of plant management, have proved exceptionally valuable in giving a dispassionate view of current events, policies, and controversies. Every strong industry needs a stable and independent Technical Press, but we can only enjoy one if generous advertising support is afforded. I feel that the existence of a Technical Press is of much greater moment to any industry, and to each business in it, than the purely commercial view as to whether an advertisement brings orders to offset the cost.

I feel that all members value our Association's Quarterly Bulletin, and I take this opportunity of recording our appreciation. The various technical abstracts contained therein are most instructive, and proof of the interest members are taking in this section is shown by a recent request that we might consider facilities for members to acquire through our Association and at reasonable cost copies of the full abstract.

Education

The question of education and training is of fundamental importance to meet the increasing demands of our expanding industry. Many appeals have been made in the past, and as a result the subject is commencing to receive the serious attention it merits by the authoritative bodies. The problem appears to be divided into two categories: first the young aspirant entering the industry with administrative intentions, and secondly the training of future plant operators. The first is naturally the most important, since the success of the second is dependent on the quality of the supervisory staff. The correct choice of a trainee is very important. Initiative, originality, confidence and ability to apply accumulated knowledge is essential. Having chosen the aspirant, it is up to us to introduce new schemes to augment his studies and maintain his full interest. We should give facilities such as access to technical literature, opportunity to gain practical experience, inspection of other plants, and afford him chances of attending technical meetings. We must see to it that their remuneration is sufficient to sustain their interest, justify further studies, and not, as in the past, allow it to fall below that of a semi-skilled worker.

It may be necessary to consider means of enhancing the status of our Association. It is believed that as there is much in common between gas and coking technologists, some effort might be made to bring them together on a common platform—professionally and technically. By so doing we could pool knowledge and resources to a greater extent than is possible under the present conditions of friendly isolation. Reduce any parochialism that may exist, and thus mutually assist one another to bring about a general advance in the technology of the carbonization of coal.

Coking and gas engineers are both engaged in the technical control of the carbonization of coal. Each section is dealing with approximately the same tonnage annually. Each has to deal with the production, treatment and disposal of coke, gas, tar, crude benzole and ammonia. The only differences lie in the stress that is laid on one or more of these products by each industry in order to satisfy different markets. This applies particularly to gas and coke, but the underlying technique is the same in each industry. The Coking Industry exists primarily—but only primarily—to produce metallurgical coke, coke suitable for central heating and other boiler applications. The Gas Industry exists solely to produce gas for town distribution for domestic and industrial use. So far no method has been demonstrated

which will enable a cheaper gas to be produced than the present practice of carbonization. This entails the production of coke and the other residuals which, when dealt with efficiently, in production and sale, have the effect of materially reducing the cost of production of gas. Another major difference in technique arises from this difference in objectives. It has been found that the best known method of making metallurgical coke from small coal is by the employment of coke ovens—the ovens being heated usually by means of part of the gas produced. On the other hand, the Gas Industry, which has as its objective the production of gas for town purposes, generally uses other methods of carbonization which give a much greater yield of gaseous therms, and these plants are heated by means of a part of the coke produced in the process. I am aware that coke ovens have been used in the Gas Industry—particularly at Birmingham and Beckton—also that coke ovens may be heated by producer gas. The most economical way of running coke ovens is for them to have a constant daily load, winter and summer. Consequently they can only be employed on very large gas-works to supply base load gas. They should not be subject to the varying peak demands inherent in town supply. It has been shown, on the other hand, that producer gas made from coke usually costs more than coke oven gas for heating ovens unless the price obtained for coke oven gas is much higher than is general to-day. Gas-works must use plant which has wide flexibility of output. This is the justification for a portion of their production being by means of water gas—a gas which is otherwise most costly to make. From what I have said in indicating the differences between the two industries, I believe it will be accepted that such differences that do exist are only in markets and emphasis. The technique is fundamentally the same for all intents and purposes.

A Surprising Proposal

Many people are surprised to learn of the proposal that there should be formed an Institution of Coal Utilization Engineers or Institution of Coal Technology. The gas, coke oven, and electrical industries "utilize" over 60 million tons of coal per annum between them. What can the new institution cover without encroaching on these industries. There appear to me to be distinct disadvantages in professional institutions being formed from those engaged in particular industry. They become limited in outlook and savour of a mere trades union objective. Membership of a professional institution should be a guarantee of training ability and competence—wider than that required for any particular industry. This applies to such bodies as "The Civils," "The Mechanicals," The Royal Institute of Chemistry, the Institution of Chemical Engineers, and the Institute of Fuel, and many others which might be mentioned. I can visualize eventful affiliations into a parent body with a title like "The Institution of Carbonizing Engineers" for all people engaged in thermal treatment of coal. Such an institution would be open to any man of sufficient training and experience who is engaged in the subject of carbonization —industrial or research, low or high temperature, engineer, chemist or physicist. I suggest that it would entail no sacrifice on the part of present associations. Indeed it should enhance their professional status, broaden their horizons, and increase the range of opportunity for advancement. In these matters I am expressing my own personal views—but with the knowledge that I am not alone in holding them. I hope that before long further effort will be made in a serious way to unify the profession of carbonizing technologists. I believe that many coke oven technologists would welcome such a move, subject to its being understood that there should be no question of their being absorbed by an outside body unassociated with their own industry or lose their identity.

On the administrative side of the coking and gas industries there has been a gradual "getting together," particularly on coke, tar, ammonia, and benzole matters. It is to be hoped that there will be the maximum interchange of experience and the necessary co-ordination between the respective research associations.

Stability of Heated Structures*

By L. MUIR WILSON

South Metropolitan Gas Company

MOST substances, when they are heated, expand, and it is this expansion which, though of a small order, is irresistible, and can cause great havoc with large structures. Expansion takes place equally in all three dimensions, and if proper provision is not made for its accommodation the brickwork is very seriously displaced. Should movement be completely obstructed by means of massive steelwork or by similar means, the bricks may have to accommodate themselves as best they can by crushing each other or bursting out in unexpected places.

A brick structure is not a jelly, so by restraining expansion in one dimension it is not possible to make it move in another dimension. This may be contrary to common belief, but it is generally true, though the behaviour of properly constructed arches may, on superficial examination, appear to be exceptional.

There are two kinds of thermal expansion. First, the straightforward sort which is familiar to everyone. Secondly, a sort which is brought about by a change of crystalline state in the brick; this is not always entirely reversible on cooling, so some of the expansion may be permanent. This is associated with silica bricks. Much has been said and written on this subject, and so I will say no more about its mechanism here. Thermal shrinkage must be considered also. This is usually associated with fireclay bricks, whose matter expands like any other matter when heated, but at high temperatures, say from 1,100°C. onwards, the bricks, as opposed to the material of which they are made, appear to shrink due to loss of porosity and the formation of glass-like substances.

The expansion curves for a silica brick and a firebrick are as shown in fig. 1. The firebrick curve is not quite one which might be obtained on a short laboratory test. It is drawn to show what happens when bricks are kept under load for months. No matter how well grogged the bricks may be, there will always be a tendency for the fireclay material to yield and shrink after the 1,100°C. mark is passed.

Attempts have been made to minimize the movements of structures by mixing the two kinds of bricks so as to give no overall expansion. On examination of the curves, it is clear that over the greater part of the range both types are expanding simultaneously, and that the fireclay only shrinks after the silica has practically ceased to move, so it is not surprising that the attempts have failed to give the wished-for results.

These expansions and contractions are not of a high order, but they can be disastrous to a big battery of coke ovens or to a big battery of, say, 20 horizontal retort settings. They are of special significance to gas undertakings with no water gas plant, where settings have to go up and down a great deal. This explains why the larger gas companies have to pay so much attention to the matter. At 1,300°C. the coefficient of expansion of silica brick may be 1.25% and of fireclay 0.78%. Thus a battery of 20 settings, 200 ft. long, with no internal expansion joints in it, would, if it contained at least one continuous course of silica, grow longer by 2½ ft., and each end setting would be shoved sideways by 1¼ ft. and the intermediate ones in proportional degree. The intermediate settings would all be more or less seriously damaged, the damage being greatest towards the ends of the battery, retorts being crushed, and many important items, such as gas and air ports, being cut off from their communications. To make an allowance of about 1 in. in 4 ft. for expansion, which is equivalent to a little over 2%, is a safe working figure and easily understood by practical men.

I will now try to explain, as concisely as possible, the principles on which the stability of the structure depends.

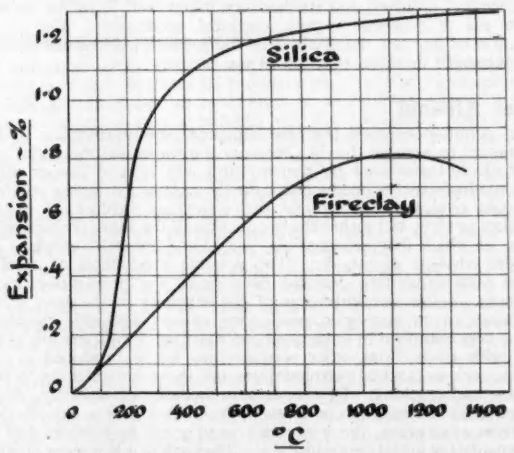

FIG. 1.—*Expansion curves (silica and fireclay).*

The Structure

A structure stays where it is because of the weight of the materials put into it and because any disturbing forces, such as wind and vibration, are insufficient to affect it. But while it is being heated it is no longer stable, for internal forces which are practically irresistible

* Paper to the Southern Association of Gas Engineers and Managers (Eastern District), Oct. 23, 1945.

get to work. These forces are set up by the thermal expansion of the materials used. In the simple case of a line of bricks placed end to end, every brick, whether it is heating or cooling, will endeavour to stop on its original centre-line. During heating only the centre brick of all will manage this. It will grow bigger about its centre, pushing away its neighbours, and they in turn will push themselves away due to their own increase in size. On cooling every brick will stay on its new centre and a space will appear between each brick. This space will be equivalent to the total contraction of one brick. With this picture in our minds it is easy to understand how it is that structures which expand appear to contract not at all. A single line of bricks, as just described, might be pushed back into place as they cool, but were other courses piled on top of them and loaded so as to make a wall, say 12 ft. high, then the friction towards the bottom of the wall would be so great that it would be almost impossible to cause all the gaps to close up. The gaps might also have filled with bits of fallen jointing, which would prevent closing. Likewise, when the wall is heated a second time the joints are not likely to close, but the wall will expand nearly as much as it did the first time. One may ask what does the jointing do? The answer is that it does not act as an adhesive till it has become fused. Then on cooling it causes cracks to appear in the walls instead of opened joints.

Since the loading is higher at the bottom than at the top of a wall, the wall will tend to come out most at the bottom where the bricks are least able to slide, and this will tend to bow the buckstaves where they are weakest, at about stage level. In order to reduce this internal friction to a minimum, expansion joints should be as little broken as possible.

The expansion joints, if they are deep, should be built round a withdrawable board. The board keeps the bricks in line, keeps dirt out, and prevents snods. Shallow joints should be sealed over with tar paper ribbon, made by slicing up rolls of tar paper. On no account should expansion joints ever be filled with meltable or combustible material, because they may be subjected to pressure from some remote and hotter part of the structure long before the filling can be destroyed; also, in the absence of air, the filling may carbonize to incompressible coke. They must be minutely inspected for cleanliness before covering in.

In this connexion it should be mentioned that, when a silica segmental retort cools, the circumferential joints of the retorts open up. When settings are down, bricklayers take a delight in stopping up these joints. This is a very bad practice, because the gaps will close again on reheating and, if they are filled up, the retort will increase in length over and above its previous hot length by just the sum total of all the gaps. If this process is repeated once or twice, all the expansion allowances on the binders will be used up and much trouble will follow.

The lesson to be learned from all this is that structures expand about their centres, and if no part of an edifice is to wander too far laterally, this can only be achieved by subdividing the edifice into many structures, each of which remains on its original centre. For instance, it is undesirable for a pier wall of a setting to be pushed bodily sideways by forces set up in other parts of a battery of settings. This will not happen if it is protected by suitably arranged expansion joints. So all vital parts of the edifice, which must not be displaced, should be regarded as separate structures and protected in this manner. In coke oven construction it is usually sufficient to make sure that the main pillars between the ovens remain unmoved from their centre lines, but in horizontal retort sections not only the pier walls but the nostril blocks and the retorts should stay put. In the dimension axial to the retorts or ovens, expansion joints are not permissible because the vessels have to be gas-tight. Ovens are allowed to increase in length while slacking off the tie rods. In horizontal retorts they too are allowed to expand freely, while the binders can travel with them, but the buckstaves, from which the binders spring, are fixed. To prevent the pier walls from disturbing the buckstaves, these walls are broken up into three or four sections by means of vertical expansion joints. These joints are broken so as to prevent waste gas from travelling from one setting to its neighbour.

Arches cannot be protected by expansion joints, which run parallel to their skewbacks, because they would spread and fill the expansion joints, but their very nature precludes the necessity of such a precaution. The effect of an arch growing along its periphery or being squeezed in by its skewbacks is to rise. Thus an arch is an effective vehicle for converting horizontal into vertical movement, but an allowance has to be made to accommodate the extra lift. Corbelling over a gap is, on the other hand, a very effective means of accommodating the thrust without lift, for the gap itself then assumes the function of an expansion joint.

Arches

Now let us consider the behaviour of arches, starting with the familiar 180° semi-arch. This arch is only stable if every brick is pressed in or pulled in towards the centre by some force. For instance, a barrel is only stable if it has a hoop round it, and it is only gravity which keeps the bricks in place. In a semi-arch it is only the bricks in the crown, over an angle of about 90°, which are being pressed effectively in towards the centre, while the remainder of the bricks are lying more or less on their sides. In the lower parts of the arch the force which tries to squeeze the bricks outwards overrules, so those parts of the arch which are from 0° to 45° and 135° to 180° are unstable. Thus semi-arches have, in practice, to be loaded up on both sides until only about the middle 90° is left uncovered. But what have we done to achieve stability? Why, we have converted the 180° arch into a 90° arch, and would have done better to have started with a flatter arch of wider span in the first place, for we would have saved much expensive brickwork and valuable space in so doing. As a matter of fact a 60° arch is an even better arch than one of 90° in practice. This will have a radius of about 13 ft. Such an arch may seem weak, but remembering that a part of an arch is stronger than the whole, it would, if extended to 180°, span a 26 ft. road and be capable of carrying a railway train.

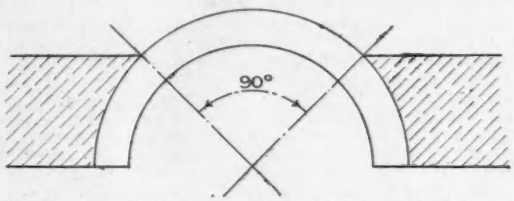

FIG. 2.—*Diagram showing how a 180° arch has to be loaded up to the 90° load line.*

All arches need to be tied across to prevent them from spreading and collapsing; arches of less than 90° are satisfactory if tied at the skewback only. If such arches are effectively tied, they with their ties can be regarded as covering slabs when placed across gaps, and no horizontal thrust will be transmitted to the supporting walls.

Absolutely flat tops supported on the cross walls have been tried, and abandoned because too much weight is transferred to the retorts, and because the whole top has to be stripped when a reset is needed. The flatter arch of about 60° seems therefore to be the best compromise between the semi-arch, which causes great waste of material for filling up, while not leaving much room for heat insulation on the top where not most needed, and the flat top.

A hot silica arch can always be made a little flatter than a fireclay arch because the silica arch rises most on heating, while the fireclay arch may even drop a little at high temperatures while under load, and this in very flat fireclay arches can cause collapse. There is no easy way of calculating what the lift on the soffit of the arch will be, but it is easy to make two laths, one of length equal to the cold periphery of the arc and one to the hot periphery. When these are bent into the skewbacks, side by side, the difference in their heights represents the lift to be expected.

If an arch is constructed of two or more rings of 4½-in. side wedges and heated on its underside, then the bottom ring expands the most, pushing up the ring above, which thus represents only extra weight and no strength. It is therefore better to construct arches of one single ring with 9-in. end wedges. Reasonably flat arches are always under considerable pressure, and therefore can be tight despite the fact that their joints may not be covered. Such arches are not bounded and are thus easier to repair. If the top ring of a double ring arch is most heated it lifts from the one below, so this arrangement is not very satisfactory either. If an arch, on the other hand, is built up of several rings and heated from both sides, it does not matter very much whether side wedges or end wedges are used, or how many rings there may be.

Buckstaves

Buckstaves cannot be used to prevent expansion, and though they should always be of very heavy section, they should be as much protected as possible from expansive forces. It is permissible to use them for the purpose of guiding expansion into the joints provided for the purpose, and as support for skewback channels where it is impossible to use tie rods, but any distortion which front and back buckstaves suffer detracts from their main function of keeping the mouthpiece ironwork in its proper place against gravity and ramming thrusts. End buckstaves should be chiefly concerned in keeping up the main arches of the settings and causing expansion joints to function in the manner intended; any weakness on their part can cause the arches to move in an unsatisfactory manner. It is always bad, though sometimes unavoidable, to use buckstaves to support such structures as the roofs of buildings, guide car tracks, and coal hoppers. Buckstaves have quite enough to endure without these additional loads, and their movements may give rise to all sorts of queer complications, such as the disalignment of shafting and belts.

Buckstaves bow so that their concave side is next to the brickwork. It does not follow, however, that the buckstave will be in contact with the brickwork, which pushes it out of shape and place along its whole length; indeed it would be very surprising if it were. Consider the usual type of buckstave tied at top and bottom, and let us assume that the brickwork is so well behaved as to move out uniformly over its whole height, then the effect will be for the buckstave to be in contact only at the top and bottom and clear of the brickwork in the centre. The only cure for this sort of deflection on coke ovens is to let out the top and bottom ties so as to keep the buckstave a reasonable

shape, while still maintaining a reasonable pressure along its whole length. The pressure will always be greatest at the top and bottom rather than in the centre, where it is most needed. There is need for precision about what is meant by a reasonable pressure. It is not reasonable to tighten up on buckstave screws until the buckstaves bend, nor is it reasonable to neglect to slack off until the buckstaves bend. Not only is such treatment grossly unfair, but it relieves the brickwork of support at the centre of the buckstaves, where it is most needed. In fact a really heavy buckstave need hardly be stressed at all. All that is required of it is to provide a good solid support should the brickwork attempt to move under the influence of the ram; if it can resist in this respect it should be quite capable of holding up the doors and attending to other such minor duties. I am not quite sure, however, that this is the whole story.

It may be that heat plays a part in causing deflection of the buckstaves. The inner flange is warmer than the outer one, so at first sight one would expect the buckstave to attempt to bend the opposite way to that, which in fact it does. If this did happen, two channels bolted back to back instead of face to face would give better results, because the centre web would be thick and more likely to conduct heat so as to level up temperatures. However, in service, buckstaves tend to get a permanent set, so that their concave side is toward the brickwork, and this is not peculiar to ovens where flare from ill-fitting doors may hit them, but occurs on horizontal retorts, where flame never reaches them, and where they are not heavily stressed because they are well protected by expansion joints. The permanent set may result because stresses are annealed out by maintaining the metal at a quite moderate temperature for a very long time. This would not account for a permanent set in a buckstave which has never been sufficiently stressed to give such a large set as that found unless it were restressed time and time again. I am rather of the opinion, although I lack the scientific proof, that moderate temperature and long time may, in certain circumstances, cause a crystalline modification, resulting in bigger grains, which is more pronounced towards the hotter side of the metal. This could cause the inner flange to contract, resulting in an inward bow. It ought to be quite easy to settle this matter by cutting sections from affected buckstaves and subjecting them to the usual examination. If this is the cause, then one would expect the better insulated buckstaves to behave best, likewise those with heavy webs and those which press on flash plates of large radiating surface.

I am not fond of such gadgets as springs, lead washers, and lumps of wood which are placed behind buckstave tie rod nuts, the idea being to provide something which gives way under excessive pressure. Springs are, of course, the least objectionable and may even be of slight use at times, but wood is apt to split and fall out, and even lead washers have been known to melt. In any case the yield points of these last two is something of a gamble. On end buckstaves there should be no question of letting out, but if the brickwork centres are to be kept constant, they should be slightly tightened to compensate for the thermal expansion of the tie rods. In actual practice this amount is small and to some degree balanced by the expansion of the end walls, so they are just as well left alone. The cross ties on our settings are riveted up solid, since we leave expansion joints in the pier walls, but on ovens it is sufficient to see that the expandable cross tie rods, while heating up, join the buckstaves about 3 in. above the battery top so as to leave room for vertical expansion. If, then, the tie rods are so slack that their centres just sag to the brickwork and are kept so by slacking off as time goes on, they will exert the reasonable pull required. When the expansion is finished the tie rods can be hammered down to their final position and then tightened until they show just no deflection. If springs are placed behind the tie rod nuts the same solidity is never achieved, and there is likely to be an imperceptible, though undesirable, vibration in response to the disturbances set up by the ram and other oven machinery.

Having told you what the game is and having defined some of the rules, now let us see how the game is played. This part of the Paper will be a more or less rambling affair, touching on various practical applications of our knowledge as points of interest crop up.

Coke Ovens

First of all I will talk about coke ovens before coming on to the more complicated horizontal retort settings. This should be of interest to all, because the proper way to carbonize coal is in slabs, whether the coal moves horizontally or vertically, intermittently or continuously.

Coke ovens are built on what I like to call the pillar system. Each pillar is as long as the oven and as high as the oven plus the height of the regenerator space below the oven. The part of the pillar which comes between the ovens is hollow, so as to contain the heating flues. Fig. 3 illustrates the arrangement of these pillars, which must always remain fixed on their longitudinal centre lines. The ovens and regenerator chambers represent just so many expansion joints between the pillars and so get narrower on heating, when the structure may get about 3 in. higher and move towards the observer by about 3½ in., representing an increase of oven length of 7 in. The filling of the regenerator chambers must allow for the decrease in width of the chambers. The ovens are bridged over with wedge-shaped lumps, narrow end up, so as to retain the jointing, and are paved with slabs supported on corbels. The slabs are arranged so as to allow for broken expansion joints. The buckstaves, which cover the pillar

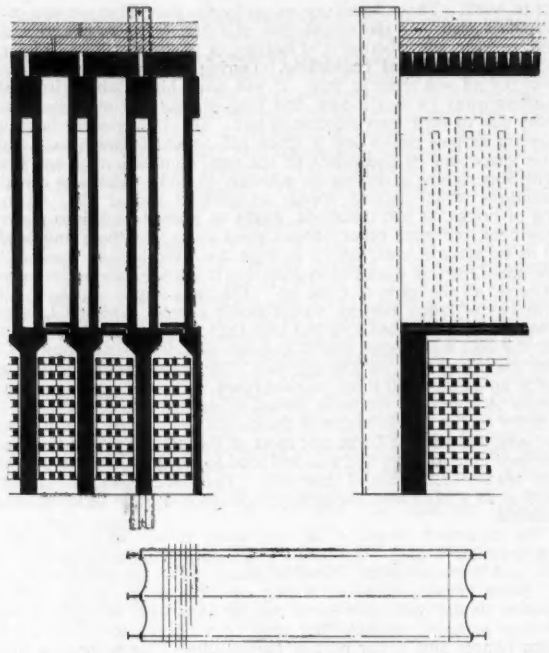

FIG. 3.—*Pillar system coke oven plan and two elevations with buttress wall, tie rods, and one or two buckstaves.*

ends, move out because their top and bottom ties are let out and kept slack during heating up, but the end buckstaves remain fixed so as to keep the pillars on their proper centres. It will be noted that all bricks which have to slide are almost free from load.

As regards the oven chambers themselves, they are so simple that they will stand a lot more letting up and down than will horizontal retorts. But gas tightness of the regenerator chambers is so vital that particular thought should be given to them before one can generalize about a complete battery of ovens, and, too, the great length of modern ovens influences the situation. Nevertheless, the general opinion that ovens are the thing for steady load and retorts for up and down load must not be accepted at its face value. It has come about because coke oven managers are used to keeping their plants steadily at work for 15 years and more, so viewing with horror any action which is likely to reduce the life of their plant, while gas-works folk are used to the evil necessity of letting their retorts up and down to suit the seasons. It does not necessarily follow that coke ovens need fare any worse than retorts should the necessity arise to go up and down.

There is always a likelihood of trouble appearing where one type of brick ends and another begins. The oven dividing walls are built of silica, while their continuation between the regenerators is often built of fireclay. These walls are constrained by the buckstaves, whose job it is partly to keep the brickwork tight together. The silica is not only hottest, but expands the most and so receives the full buckstaves' pressure, while it benefits by the deposition of gas carbon in the joints. The fireclay work, certainly where it is in contact with the silica, is pulled apart by the friction of the brickwork above, and this at a level where the buckstaves are most apt to bow. This opening of the joints in the tops of the regenerator walls is most likely to look less serious than it is, for on examination behind the buckstaves no great gap may be noticeable behind the steelwork where the fireclay work begins. Some designers have got over this by continuing the silica work down to the bottom of the regenerator. One plant which has been at work for 20 years was built in this way and has outlived some of its rivals by ten years.

One curious thing about ovens is that some types grow longer while working under steady conditions. The growth is not very rapid, but may be sufficient to crack up the flash plates and bow the buckstaves so badly that they need changing after about six years, when the deflection may be nearly 6 in., while on other plants the buckstaves do not seem to have been affected appreciably after 20 years. Heavy buckstaves are always desirable, but increasing their weight is no cure for this trouble. It is difficult to amass all the evidence one would like on this subject, because things of this nature do not feature in advertising programmes, nor is it easy therefore to speak with exactitude, but in my limited scope the trouble seems more prevalent in ovens where there is only about 4½ in. of brickwork in the side walls between flue and oven than where the side walls are 6 in. or more thick. What I think may happen is that the side wall bricks contract slightly, perhaps by only one-thousandth of an inch over the 40 ft. length of the oven, when the cold and often wet coal is dropped in. Before the cooling effect of the coal has had time to work off, gas

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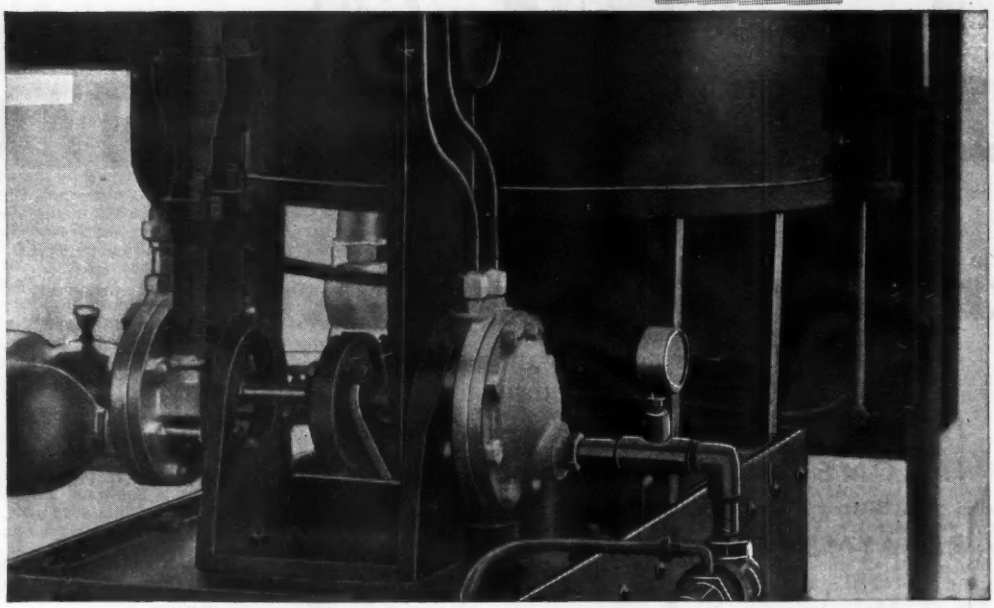

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carbon has formed in the joints. Thus when the wall expands again it has to get one-thousandth of an inch longer. On the basis of one charge every 16 hours, this could account for a growth of between ½ and 1 in. a year which is about the order of things, and a contraction of one-thousandth of an inch over such a length does not seem unreasonable. A thicker wall will have a higher heat capacity and therefore contracts much less, which can account for its greater stability. There are rival explanations, but I like my own best at the moment.

Whether or not this happens with segmental horizontals I cannot say. It would not much matter if it did, because they do not stay at work long enough to take harm from such a cause, but there are reasons why horizontal retorts should grow while in use.

Horizontal Retorts

The front and back buckstaves, unlike those on coke ovens, are fixed at the top and bottom. Instead of covering pillar walls, in which expansion breaks are not permissible, they cover the pier walls, which can be broken up into three or four sections by expansion joints. If the buckstaves moved they would take the binders with them, and the mouthpieces in their turn would come away from the retorts. It is better that the binders should be so arranged, by means of a simple wedge and cleat, that they can be let out if need be, thus not to press unduly on the expanding retort segments while still keeping the ironwork in place. Care must be taken to ensure that sufficient pressure falls on the retort segments to keep them tight, and it is not the hotter stop blocks which are forcing the binders away. Therefore the stop blocks should be set with about ⅛ in. clearance. Buckstaves suffer from one very serious fault. They have a natural tendency to bow in the middle at about stage level just where the setting is hottest and where the pier walls come out most, due to internal friction. One way to get over this may be to build the settings on a reinforced concrete raft suitably broken with expansion joints level with the stage (fig. 4). Then the buckstaves would end at about stage level

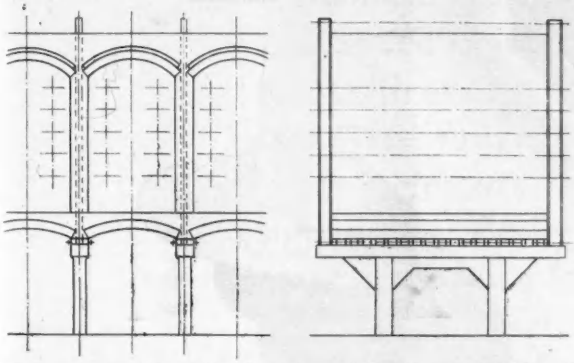

FIG. 4.—*Horizontal retort setting set on reinforced concrete table with tie rods beneath the table and independent producer.*

and be tied by rods passing below the concrete raft. The producer would be installed quite independently below the concrete raft. Shorter buckstaves, tied where they most need it, seem so attractive that we are contemplating a section which incorporates this feature. To make a success of such a scheme, proper attention would have to be paid to insulation and ventilation, which we will now discuss.

The effect of heat insulation needs a little thought. First of all a setting may be constructed on a concrete raft, which must not become overheated by a superimposed hot waste gas flue. Otherwise the concrete would be destroyed. It is quite useless to attempt to keep the concrete cool by means of a supervening layer of insulating bricks alone, because the insulation will only slow down the rate at which the concrete gets heated and have no effect at all on the final temperature, which will do all in its power to equalize with the temperature in the flue. Time is of little moment when the setting is likely to stay at work for some years. The proper solution is to leave a ventilated space of one or two courses of soldier bricks between the concrete and the insulation, so that the little heat which seeps through the insulation can escape to atmosphere. The heated air from this space can be used as secondary air for combustion—not that there is much heat in it, but it is thus kept moving.

It is highly necessary to make sure that the buckstave bottom tie rods and the like pass through zones which are adequately cooled by ventilation.

When insulating hot surfaces, say the fronts and tops of settings, it should be borne in mind that the insulation will raise the temperature of the original surfaces, so one must be sure that both the covered material and the insulation will stand up to the new conditions of temperature, and that adequate allowances have been made for expansion on a higher scale in what were the top courses. Otherwise they may cockle up like wood paving after a thunderstorm. This behaviour of wood paving is instructive. During dry weather the blocks shrink and dirt fills up the cracks; when they get wet again they have thus no room to expand and so have to rise up.

There is something to be said in favour of producers which can move about independently of the setting above them. The up and down movement caused by producers and other hot brickwork below stage level can amount to as much as 2.5 in. of lift, and this, on occasion, has been very serious. Our first experience of it was with a section where the producers were arranged back to back under every third setting (fig. 5). Pillars 1 and 2 either side of a producer, likewise 4 and 5, became heated and expanded, with the result that the cold pillar 3 was left behind by its skewbacks, which went up with the rest, leaving a gap over 2 in. wide. This was repeated at regular intervals all along the bench, although it seems unbelievable that brickwork can hang thus unsupported. Sooner or later something would have fractured and the shock of so much brickwork slipping would have caused great damage, so the gap was filled in as quickly as possible. Likewise, when all the producers are on one side of a setting, a hot flue or the equivalent has to be placed on the other side so as to keep things level and avoid damaging the retorts.

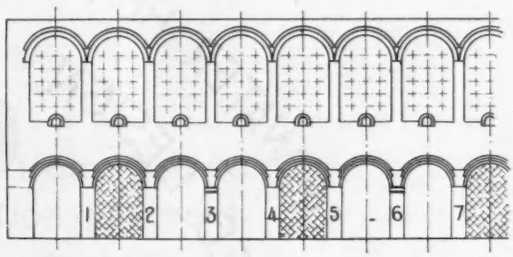

FIG. 5.—*Section with one pair of producers under every third setting. One pillar is thus unheated and gets left behind by the rest of the section. Pillars should be numbered* 1, 2, 3, 4, *and* 5, *with producers between* 1 *and* 2, 4 *and* 5.

An example of the wrong use of arches is to run one or more arched flues under the whole length of a section and to carry the structure of the settings off them. When these arches get hot their soffits rise and cause distortion, which may not only distort the retorts, but go right to the top of the structure (fig. 6). We have abandoned this

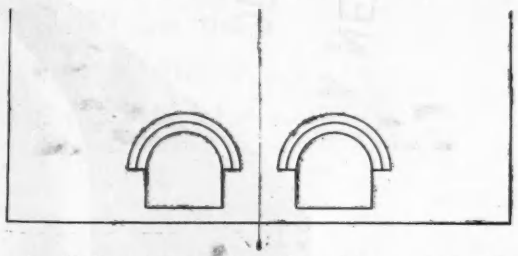

FIG. 6.—*Horizontal retort setting with two bottom waste heat flues.*

bad practice in favour of the corbelled type of flue shown in fig. 7, or we have relieved the bottom flue of burden at all points except where it passes through the pier walls. In practice the pier walls moved a little, but we know that had the retorts been unprotected they might not have been so excellent as use has proved.

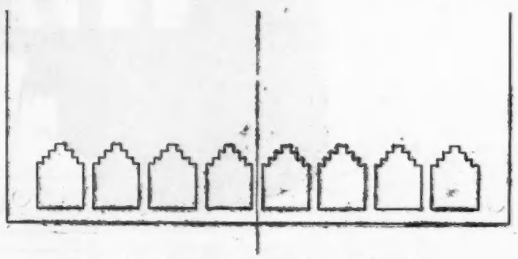

FIG. 7.—*A type of corbelled waste heat flue.*

From the point of view of thermal movement it is never wise to mix brickwork. Though it is quite usual to see fireclay, silica, and high aluminous bricks present in the same setting, the practice can, and often does, give rise to awkward stresses. Whenever possible bricks of different composition should neither be bonded to, nor superimposed on, each other. In the case of high aluminous producer linings, bonding can be entirely avoided, and superimposition need not occur if the main walls of the producer, which are of fireclay, are corbelled out over the linings.

The outer faces of the end piers of a section can be built of inferior

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material, but this work should not be bonded into the main piers of the end settings. Otherwise I am strongly of the opinion that it seldom pays to use different materials above stage level in the belief that silica should be used only in the hottest parts. Some folk indeed have curious ideas about which are the cooler places. Pier walls built of fireclay have had bonded faces of silica, but there can be no temperature gradient whatsoever through such walls, which are heated from both sides, except just toward the tops and the ends. The two materials do not expand together; in fact the fireclay goes on expanding for some time after the silica has almost finished. Due to the effect of friction in the wall its expansion will be much more nearly the sum of the expansions of the two materials than the mean of their expansions. Such shuffling movement is not desirable in the most important weight-carrying members of the structure, and it is just as likely to upset the covering arches as the buckstaves.

The mixing of materials plays tricks within the setting proper. In the type of combustion arches used in our Company the apex of the arches is rather high, but this facilitates the taking of temperatures and repair work, though it complicates the structural problem. These arches, which form the combustion chamber, are two flattish arches placed face to face; they are not held at their top skewbacks and so are free to rise but not free to expand laterally, for in so doing they would displace the retorts on either side of them. The result of their upward movement is slightly to roll the upper retorts, so that their major axes are inclined toward the pier walls. This tilting movement is made up of two components:

(*a*) Horizontal expansion on the total width between the retort centres which is converted into upward movement. So far as I can see nothing can be done about this, for expansion joints here would weaken the structure and render the arches unstable.

(*b*) The difference between the vertical expansion across the skewbacks and the same height of brickwork on the cooler jack arch side, temperatures being 1,360°C. and 950°C. respectively. The material on the hotter side is silica and that on the jack arch side fireclay, and since the hotter material has the greater co-efficient of expansion our difficulty is accentuated. But it can be overcome by building both sides in silica, because silica has practically ceased to expand at 600°C., as can be seen by referring back to fig. 1, and both chamber and jack arch sides are over 600°C. In this connexion it seems timely to point out that these conditions apply only when the setting has attained thermal equilibrium. So considerable stressing and straining will go on while heating up is in progress, for the temperature in the chamber will always lead temperatures in other parts of the structure. In order to keep this lead at a minimum, heating up must be carried out very slowly. Once the setting is properly dried out, which needs about ten days, another 30 days is not too long for coming up from 110°C. to working temperature. Old, dry settings do not need this ten days to dry out.

(*To be continued*)

COMPANY MEETING

Malta and Mediterranean Gas Company

The Annual General Meeting of the Malta and Mediterranean Gas Company was held at the offices, 5, Great Winchester Street, Old Broad Street, London, E.C. 2, on Oct. 23. Mr. ARTHUR M. PADDON, M.Inst.C.E. (Chairman of the Company), presided.

The Managing Director and Secretary (Mr. G. MURRAY BURTON, M.A., F.C.A.) read the notice convening the meeting, and reported that the proxies received amply satisfied the requirements of the Articles of the Company.

The CHAIRMAN said: Gentlemen,—After a considerable interval we are at long last able to present to the proprietors a complete annual statement of the affairs of the Company and I think that on examination it will be found to be distinctly reassuring, not only in itself, but in relation to the troubled period from which we have now emerged. The proprietors can have only a very faint conception of the amount of damage and disturbance that we incurred in Malta by reason of the war and I think we are fortunate in our present position in having been able to deal with them with the measure of success that has attended our efforts. It is no use making any statistical comparisons because the previous accounts did not relate to a complete period and disturbances in costs and other disturbing elements make anything like a comparison futile; in fact it would be worse, it would be misleading.

We may therefore confine ourselves this year to the statement as it stands. There are some very reassuring features that would appeal to anybody who is conversant with gas affairs. Coal, oil and coke have cost just over £22,000, and on the other side of the account we have recouped from residual products over £12,000. That is a ratio which is extremely favourable to any gas undertaking. Another important outcome is that we have arrived at a profit for the year of £5,791 after a series of periods in which no profit accrued at all, so that represents a considerable advance. Proprietors, present or otherwise, may feel that with such a material increment to declare it should be possible to pay an Ordinary dividend. The answer to that is that when matters are in a stage of liquefaction and we are committed to large amounts to complete the re-establishment of our works and our business in Malta, we do not feel in the circumstances and in the interests of the Company that we should permit ourselves at this stage to begin the payment of an Ordinary dividend until the situation has been further improved.

Turning to the Profit and Loss Account you will see that we carry forward to the next account £4,318, which is an earnest of the prospect of resuming our Ordinary dividend in the near future. Looking at the Balance Sheet you will see that our investments in Trustee Stocks at the conclusion of this period of account amounted to £32,000 nominal and a market value of £51,000 and you will see on the other side of the account that the total amount of issued capital for which we are responsible in your interests is only £44,310, so that there is a balance of roughly £7,000 between our investments and our capital commitments. To have preserved that balance through such a troubled period has not been easy and possibly in the rehabilitation of our business we may have to draw temporarily on that investment, but I am perfectly confident, as matters show themselves at the moment, that we shall be able to preserve that very fortunate position which has been such a comfort to us of having our capital secured elsewhere. Not every Company can say that. On the assets side we have cash at bank £14,000, on which we shall draw to reconstitute our business, but any further disturbance in our cash position will, I feel, be only temporary, even if it is a little exacting at the time, because I can assure you that the Company's business is progressively increasing.

On the other side you have the Ammortizement Account, which has again been augmented by dividends from investments. The Employees' Welfare Fund is a new feature, resulting from the war. I need not refer to the accounts at any further length. The general situation has improved but we may not maintain the momentum of our advance, nevertheless there is no reason why in a year from now you should not find an even more favourable report than that which we present to you to-day. Considering that Malta was very nearly *in extremis* I think we can congratulate ourselves on the position in which we find ourselves to-day. I will therefore move that the report of the Directors, together with the accounts, be and are hereby approved and adopted.

Mr. GEORGE EVETTS seconded the resolution, which was carried unanimously.

Commander HYDE C. BURTON proposed the re-election of Mr. Arthur M. Paddon as a Director of the Company. As the Chairman had explained, they were now on the way to recovery and a great deal of the credit for that was due to Mr. Paddon's administration and care of the Company's affairs. He, in association with their Managing Director, who paid a visit to Malta early in the year, bore the burden of carrying on the undertaking.

Mr. A. D. DODGSON seconded, and the resolution was carried unanimously.

On the proposition of Mr. DODGSON, seconded by Mr. G. MURRAY BURTON, Mr. William Cash, jun., F.C.A., was re-elected Auditor.

Mr. DODGSON enquired whether it would be in order to ask the Chairman to convey to the management in Malta the very great appreciation of the proprietors of all they had done. They all recognized the importance of the control exercised from the London office but it seemed to him from the report that great credit was also due to those who had brought about a very great improvement in Malta.

The CHAIRMAN said he would like to endorse Mr. Dodgson's remarks, and to assure him that the sense of the meeting would be conveyed to those in Malta. He would like to refer to what had been a very important contributory element in the advancement of the Company. All had borne their part but one of the administration in London had carried by far the greatest burden and by far the greatest amount of credit was due to him. He referred to the Managing Director, who had been zealous and assiduous in his care of the Company's interests from the time he was first appointed Secretary of the Company. Mr. Murray Burton had practically reconstructed and reorganized the whole of the business from top to bottom and the results he had been able to place before the proprietors that day were really the outcome of the skill and care and assiduity with which he had carried out his work.

Mr. DODGSON drew attention to an intimation in the accounts that the Directors had voluntarily reduced their fees. The proprietors were not aware of how the Directors' fees were apportioned, or what was included in the item for "Salaries," but considering the great burden borne by the Directors and the results they had put before them he suggested that that matter should be reconsidered.

The CHAIRMAN explained that the Directors voluntarily reduced their fees at a time when there was no profit being earned to a merely nominal amount of £5 but that amount had since been increased to something like 50% of the pre-war figure.

Mr. DODGSON moved a vote of thanks to the Chairman, the Managing Director, and the other members of the Board for having achieved such a good result.

The CHAIRMAN briefly replied.

Products Prices—Stocks and Shares

The London Market Oct. 29.

There are no changes to report in the prices of Coal Tar Products.

There have been two developments of interest in connexion with Coal Tar Products, the first being the cancellation of Government contracts for toluene, and the second the issue of the Control of Benzole and Allied Products Order, 1945 (S. R. & O. 1945, No. 1064), which came into force on Sept. 1 and brings all Coal Tar Spirits under one and the same Order.

As from March 5, by the Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), the maximum price of Pitch for briquetting has been increased to 60s. per ton f.o.r. supplying works, and the prices for Road Tar, as fixed by the Coal Tar Products Prices Order, 1943, S. R. & O. No. 1528, have been increased by one half-penny per gallon. There is also an increase of 5s. per ton in the price of standard Creosote/Pitch Mixture.

Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O., 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene.

The Provinces Oct. 29.

The average prices of gas-works products during the week were : Pitch and Crude Tar,* Toluole, naked, North, 90's. 2s. 4d. to 2s. 6¼d., pure, 3s. 2¼d. Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943, Naphthalene controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

Attention is called to Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), referred to on p. 305, "JOURNAL" of March 7.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland Oct. 27.

There is increased activity both for home and export. Refined tar*: Yield to distillers is 5d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7½d. to 7¾d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 7d. to 8d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 10d., and 90/190 Heavy naphtha, Unrectified, 2s. 0½d.; Rectified, 2s. 4d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

Business on the Stock Exchange was quiet until after Budget Day, when the upward movement in prices was fairly general, especially in the shares of companies with heavy E.P.T. liabilities. Conditions in the gilt-edged market were also brighter, especially among long-dated stocks. Markets closed the week with an optimistic tone on the Chancellor's hint of further tax reductions next April.

The greater activity among speculative sections led to some diminution in the volume of business among gas stocks and shares, and there were very few price movements, as wil be seen below. The only two of note were Gas Light units, which hardened 1s. 3d. to 23s. 3d., while Imperial Continental, after several changes during the week, finally closed 8 points higher.

OFFICIAL LIST

Cape Town 4½ p.c. Cum. Pref. (x.d.)	12/—14/–	Oct. 22	
Gas Light Units	22/9—23/9	+1/3d.	
Imperial Continental	120—125	+8	
Primitiva Holdings Ord.	13/—14/–	–/6d.	
South-Eastern Gas Corporation Ord.	19/9—20/9	+–/3d	

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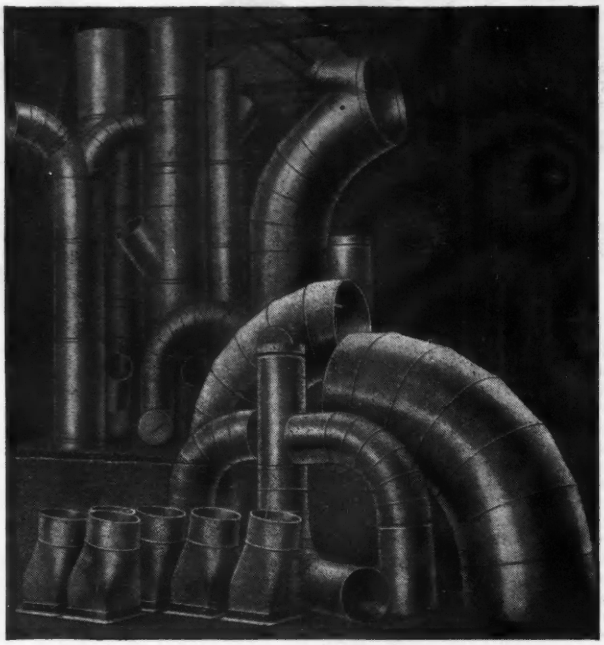

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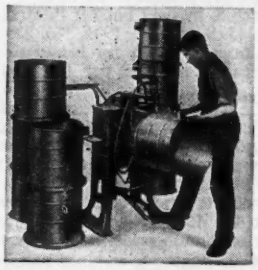

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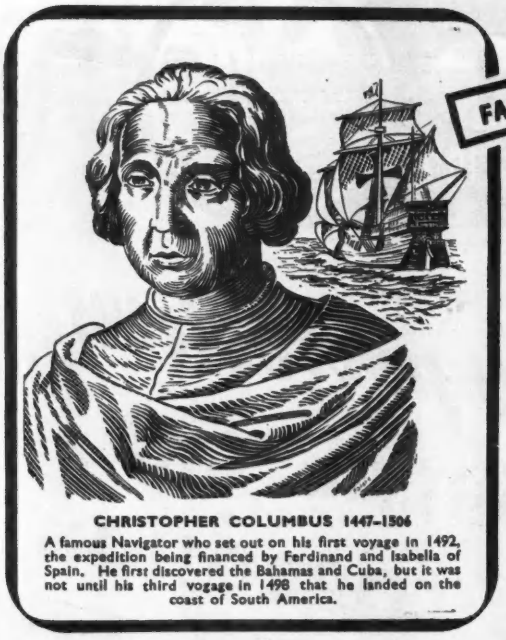

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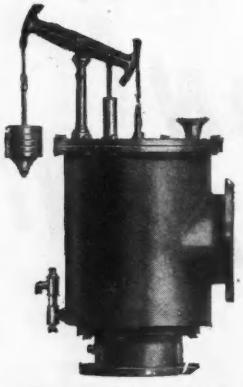

Patent No. 493222. Fig. 67.
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ENGINDEX. New Directory, Bibliography and Information Service for Engineers. Fully Comprehensive, always Up-to-Date, and essentially personal. Send stamp for particulars. BCIM/ENGINDEX, London, W.C. 1.

REPAIR WORK

STREET LIGHTING

COMPLETE Overhaul of Automatic Gas Controllers. State make and type. Quotations free on application to Geo. F. Hutchinson, M.B.H.I., 36, Lee Lane, Horsforth, near Leeds.

PLANT &c. FOR SALE & WANTED

'PHONE 98 STAINES.

FOR SALE.—24 ft. by 9 ft. and 17 ft. by 6 ft. Cylindrical Tanks; Thompson Lancashire Boiler 24 ft. by 7 ft., 120 lb.; 34 kw. Browett 220 volt Steam Generating Set; Weir Feed Pump 8½ in. by 6 in. by 18 in.; Tangye 3-Throw Hydraulic Pump 5½ in. by 6 in.; Receiver 30 ft. by 7 ft. dia., dish ends ½ in. plate.

HARRY H. GARDAM & CO., LTD., STAINES.

WANTED.—Portable Screening and Bagging Plant capable of handling coke up to 10 tons per hour. Full particulars and drawing if available to No. 9489, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

FOR SALE.—2 PURIFIERS by Walker, about 750,000 per day dry Lute.

1 GAS ENGINE-GENERATOR, 55 Kw., 220 volt, DC, driven by National Engine about 80 h.p., like new.

1 Steel Plated HOPPER, covered top, 24 ft. by 8 ft. by 8 ft.

Mayer Newman & Co., Ltd., Arundel House, Arundel Street, London W.C. 2.

HIRE COOKERS REQUIRED FOR MALTA

WILL Undertakings having obsolete stocks of Mainstay 122 or 121, or who expect to have obsolete stock when replacements are available (black or enamel), quote a f.o.r. price for appliances in fair condition and recently cleaned.

Other types acceptable are Davis, Pennines and Continental, also Alpine hot plates. Malta and Mediterranean Gas Company, Ltd., 5, Great Winchester Street, Old Broad Street, London, E.C. 2.

FOR SALE.—Reavell Single Stage Turbo Gas Booster, capacity 150,000 cu.ft. per hour at 30 in. Bar. and 60°F. against a pressure of 75 in. w.c. Complete with speed increasing gear box 2,900/1,1500 r.p.m., forced lubrication system, and 50 B.H.P. 2,900 r.p.m. S.C. induction motor by Electric Construction Company for 400 v. 3-phase 50 cycle supply. Motor is pipe ventilated from external F.D. supply, with flame proof terminal box arranged for star delta starting but without starting equipment.

Address, No. 9490, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

CONTRACTS OPEN

TREDEGAR URBAN DISTRICT COUNCIL

(GAS DEPARTMENT)

THE above Council invite Tenders for the supply, delivery and erection of the following plant at the Council's Gas-Works:

(*a*) CONDENSER.
(*b*) COKE SCREENING AND GRADING PLANT.
(*c*) STATION METER.
(*d*) WASHER-SCRUBBER.
(*e*) TAR PUMP.

Specification and Conditions of Tender may be obtained from Mr. S. L. Filer, Engineer and Manager, Gas Department, Poplar Road, Tredegar, Mon.

Tenders, in sealed envelopes (which shall not bear any name or mark indicating the sender), endorsed "GAS WORKS PLANT," must reach the undersigned not later than 12 noon on Saturday, November 24, 1945.

Council Offices, Bedwellty House, Tredegar, Mon. October 27, 1945.

OLIVER LLEWELLYN, Clerk of the Council.

APPOINTMENTS WANTED

POST-WAR DEVELOPMENT.—Traveller with well established connection amongst gas engineers, Northern and Midland Counties, well known in the industry, seeks change. Good organizer. Could work single-handed or supervise Sales Development for expansion. Keen, energetic, tactful. Excellent refs.

Address No. 9488, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

EX STAFF OFFICER, R.E., 25 years' Distribution and Commercial Experience with large Undertakings, requires appointment of high esteem, trust, and responsibility. Expert qualifications and Testimonials. Free for immediate appointment. Address, No. 9491, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

(*Classified Advertisements continued on p. 616*)

APPOINTMENTS VACANT

None of the situations advertised in these columns relates to a man between the ages of 18 and 50 inclusive or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1945, or the vacancy is for employment excepted from the provisions of that Order.

PETERBOROUGH GAS COMPANY

APPOINTMENT OF ENGINEER, MANAGER AND SECRETARY

THE Directors invite applications for the appointment of ENGINEER, MANAGER AND SECRETARY, shortly to become vacant, at a commencing Salary of £1,100 per annum, plus House, Gas and Coke.

Applicants must be fully qualified Engineers, possessing suitable technical, administrative and commercial qualifications.

The person appointed will be required to devote the whole of his time to the duties of the office.

The appointment will be determinable by three months' notice on either side.

Applications, stating Age, Qualifications, present appointment and duties, and full details of Experience, accompanied by *copies* of not more than three recent Testimonials, must be addressed to the Chairman, Peterborough Gas Company, New Road, Peterborough, endorsed "Engineer, Manager, and Secretary," not later than Friday, November 9, 1945.

R. PRINCE,
Director, General Manager
and Secretary.

October 16, 1945.

WANTED.—Fully experienced (*a*) **GAS FITTER,** (*b*) MAIN AND SERVICE LAYER. District Union Rate 1s. 10½d. per hour.

Application, stating Training and Experience, should be sent to the Manager, Gas-Works, Okehampton, Devon

GENERAL FOREMAN

APPLICATIONS are invited for the Position of GENERAL FOREMAN at a 120 million Works in the Home Counties. Applicants should have had experience of horizontal retorts, C.W.G. Plant, Benzole Plant, and be able to control labour. Salary £250-£275. £300 plus war bonus, at present £74 15s. p.a. House available.

Applications, stating Age, Qualifications, details of present employment and position under the Essential Works Order, together with *copies* of two recent Testimonials, should be forwarded by November 5 to No. 9485, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

WANTED.—Draughtsman capable of general plant and works layout. Minimum Salary £300 per annum. Applications, stating Age, Experience and position under National Service and Essential Works Order, by November 15, 1945, endorsed "Draughtsman," to T. W. T. Hammerton, Manager, East Hull Gas Company, St. Mark Street, Hull.

WOLVERHAMPTON GAS COMPANY

WORKS SUPERINTENDENT

APPLICATIONS are invited for the above Position. The Salary paid will be in accordance with qualifications and experience. Applicants must have a thorough Practical and Technical knowledge of Woodall-Duckham Continuous Vertical Retorts, Humphreys & Glasgow C.W.G. Sets, and other Subsidiary Plants.

Applications, stating Age, giving full details of Qualifications and Experience, and stating date on which applicant could commence duty, to be addressed to the undersigned: W. Macnaughton, Chief Engineer, Wolverhampton Gas Company, Darlington Street, Wolverhampton.

WOLVERHAMPTON GAS COMPANY

SHIFT ENGINEER

APPLICATIONS are invited for the Position of SHIFT ENGINEER at the Works of the above Gas Company.

Applicants must have a sound knowledge and practical experience with Woodall-Duckham Continuous Vertical Retorts, Waste Heat Boilers, Humphreys & Glasgow Water Gas Plant, and a general knowledge of all subsidiary plant on a gas-works.

Commencing Salary £350 per annum, plus 20% war bonus.

Applications, stating Age, Training, previous Experience, present occupation, and stating date on which applicant could commence duty, to be addressed to the undersigned: W. Macnaughton, Chief Engineer, Wolverhampton Gas Company, Darlington Street, Wolverhampton.

CHIEF ENGINEER.—Firm of Gas Engineering Contractors offer Position of Chief Engineer, to be responsible for D.O. and Technical Departments. Experience in Coal Carbonization Plant, By-Product Recovery Plant and ancillary equipment essential. Good salary will be paid to the right man.

Applications should give full particulars of Training, Qualifications and Experience, state Age and Salary required, and be addressed to No. 9492, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

THE CAMBRIDGE UNIVERSITY AND TOWN GAS LIGHT COMPANY

ACCOUNTANT AND ASSISTANT SECRETARY

APPLICATIONS are invited from those possessing suitable qualifications for the post of ACCOUNTANT AND ASSISTANT SECRETARY. Remuneration will be according to experience and ability, but the Company have in mind a commencing salary of the order of £800 per annum, including war bonus. The successful candidate will be required to pass a medical examination and to join the Company's Contributory Superannuation Scheme.

Applicants should be fully qualified accountants, preferably with a secretarial qualification in addition, and have adequate experience in both the accounting and secretarial departments of a public utility company, be capable of designing, introducing and controlling modern systems, and of taking complete charge of these departments and the staff therein under the general direction of the undersigned.

Applications, on a form to be obtained from and returned to the undersigned, not later than Thursday, November 22, 1945.

J. HUNTER RIOCH,
Managing Director and Secretary.

ROYAL BURGH OF RENFREW

GAS WORKS

APPLICATIONS are invited for the post of ASSISTANT GAS MANAGER. Applicants must have experience of continuous vertical retorts and knowledge of modern distribution methods. Salary £250 per annum, with free house, coal and gas and war bonus at J.I.C. rates. The post is superannuable and the successful applicant will require to pass a medical examination.

Applications, stating Age (which must not exceed 45 years) and giving full particulars of training and experience, with *copies* of not more than three recent Testimonials, must be lodged with the subscriber not later than Monday, November 12, 1945.

Town Clerk's Office, HUGH D-M. MCCUTCHEON,
Renfrew. Town Clerk.
October 23, 1945.

CANTERBURY GAS AND WATER COMPANY

TECHNICAL ASSISTANT AND CHEMIST

APPLICATIONS are invited for the above position at a commencing Salary of £260 per annum plus War Bonus of £50 per annum.

Candidates must be conversant with all the routine Gas Works Tests and capable of preparing drawings. Experience on Intermittent Vertical Chamber Ovens and/or on the Water side will be an advantage. Applications, stating Age, Experience, together with *copies* of not more than three recent Testimonials and when able to take up duties if successful to be made to the undersigned not later than November 12, 1945.

Gas Works, Castle Street, R. VEVERS SCOTT,
Canterbury. Engineer.
October 24, 1945.

THE AYR GAS COMPANY, LTD.

APPLICATIONS are invited by the above Company for the position of ASSISTANT ENGINEER AND MANAGER at a Salary of £500 per annum, with the prospect of his becoming successor to the present Manager at an early date, if found suitable by the Board.

Applicants must have first class experience in gas manufacture (vertical retorts), purification and distribution. They must have an engineering training and be capable of carrying out all chemical tests, and have experience in the control of men and capable of taking entire charge. They must also have experience of the administration and financial side of gas undertakings.

All applications to be lodged on or before Saturday, November 10, 1945, with *copies* of three recent Testimonials to the Secretary, Ayr Gas Company, Ltd., Ayr, and endorsed Assistant Gas Engineer and Manager.

REQUIRED.—Agent with active connection among gas companies for a boiler setting sealing plastic. Every support given. Industix Limited, 25, Walpole Street, S.W. 3.

OLD established gas appliance manufacturers require SENIOR SALES REPRESENTATIVE for the Midlands. Applications in confidence, stating Age, Qualifications and Experience, to No. 9487, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

MALTA.—Accountant required for local Gas Company. Salary £400 per annum. Must be medically fit. Opportunity for young man with good gas accountancy experience desiring sunny climate. Annual fortnight's local leave, two months' home leave on full salary every third year, passage paid both ways. No income tax. Special consideration given to Ex-Service men. Reply to Malta and Mediterranean Gas Company, Ltd., 5, Great Winchester Street, London, E.C. 2.

COUNTY BOROUGH OF BURY

(GAS DEPARTMENT)

APPLICATIONS are invited for the Position of ASSISTANT DISTRIBUTION SUPERINTENDENT at a commencing Salary of £230 per annum, rising by annual increments of £15 to a maximum of £275 per annum, plus bonus.

Applicants must have a sound technical and practical training in distribution work, and must be experienced in the control of men.

The appointment will be subject to the Local Government Superannuation Act 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating Age, Qualifications and Experience, accompanied by three Testimonials, must be received by the undersigned not later than Monday, November 19, 1945.

This advertisement is published by permission of the Ministry of Labour and National Service, under the Control of Engagement Order, 1943.

Municipal Offices, EDWARD S. SMITH,
Bank Street, Bury. Town Clerk.
October 25, 1945.

THE WANDSWORTH AND DISTRICT GAS COMPANY

APPLICATIONS are invited from suitably qualified persons to take charge of the HOME SERVICE DEPARTMENT and conduct COOKERY DEMONSTRATIONS.

Applicants must have a good general education, hold a recognized Diploma in Domestic Subjects, and have had previous experience in conducting Lectures and Demonstrations.

The commencing Salary offered is £300 per annum, and the successful candidate will be required to pass a medical examination.

Applications, accompanied by *copies* of not more than two recent Testimonials, should be made to the undersigned not later than November 30, in an envelope endorsed "Home Service."

Fairfield Street, C. M. CROFT,
Wandsworth, S.W. 18. Director and General
October 26, 1945. Manager.

HALIFAX CORPORATION

(GAS DEPARTMENT)

APPOINTMENT OF ASSISTANT CHEMIST

APPLICATIONS are invited for the Position of ASSISTANT CHEMIST at the Halifax Gas-Works at a Salary of £275 per annum, plus war bonus, being at present £59 16s. per annum.

The appointment, which will be terminable by one month's notice on either side, is subject to the provisions of the Local Government Superannuation Act, 1937, and the person selected will be required to pass a medical examination.

Applications, stating Age, Training and Qualifications in gas engineering and chemistry, present and previous appointments, experience in gas-works' routine analysis and chemical control, with special reference to continuous vertical retort plant, benzole extraction plant and concentrated ammonia plant, and accompanied by not more than three recent Testimonials, to be sent to the undersigned, endorsed "Assistant Chemist," so as to be received not later than Wednesday, November 14, 1945.

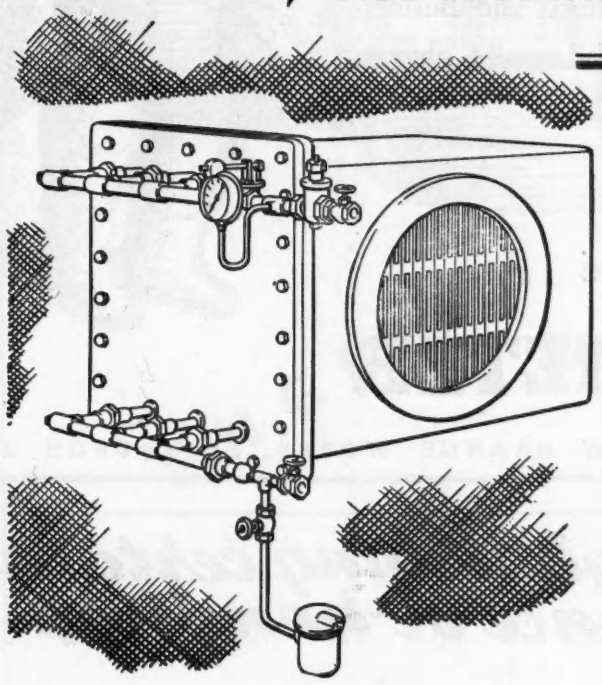
Candidates should state their position in relation to the Essential Works Order and Military Service, and, if known, the earliest date that they can secure release to take up a new appointment.

Town Hall, W. USHER,
Halifax. Town Clerk.
October 25, 1945.

FOUNDED 1850
HOLMES
HUDDERSFIELD

GAS HEATERS

★ ALL CAST IRON CONSTRUCTION



STANDARD TYPE

1 Cast Iron Casing

2 Cast Iron Heating Elements

3 Compact arrangement of elements to give high rate of heat transfer.

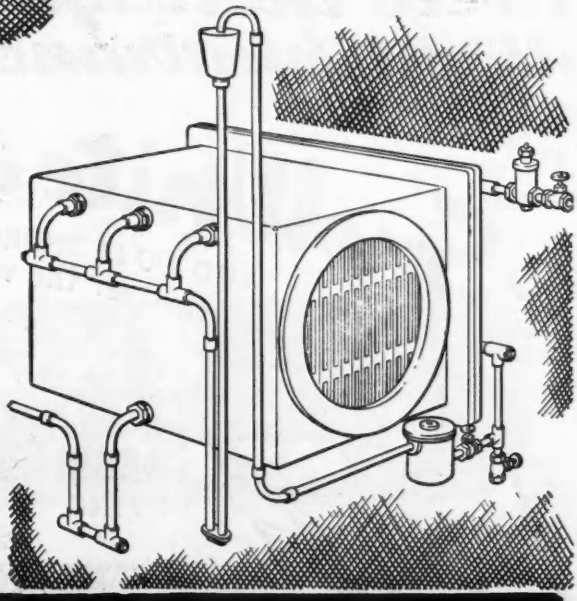
4 Elements readily accessible

5 Elements of standard construction. Spares always available

HUMIDIFYING TYPE

(Mitchell & Keillor design)

Embodying an arrangement for evaporating water from the steam trap into the gas to saturate it at the higher temperature obtained by using the heater. This device prevents drying out of theoxide in the purifier by unsaturated gas.



A large number of these heaters are in operation on gas works.

HEAD OFFICE • TURNBRIDGE • HUDDERSFIELD

LONDON OFFICE - 119 VICTORIA ST. SW1 - MIDLANDS OFFICE 21 BENNETT'S HILL BIRMINGHAM 2

Telephones: Huddersfield, 5280 : LONDON, Victoria, 9971 : BIRMINGHAM, Midland, 6830

C245

PROTECTION..

Just as the asbestos suit is man's reply to the menace Fire, so the "A & M" Meter is the most up-to-date answer to the bogey Inaccuracy. The protection afforded—in the one instance to life and property and in the other to the integrity of Industry and Business—is obvious. It is equally obvious that

your *protection* is the

"A&M" METER

ALDER & MACKAY LTD., NEW GRANGE WORKS, EDINBURGH, 11

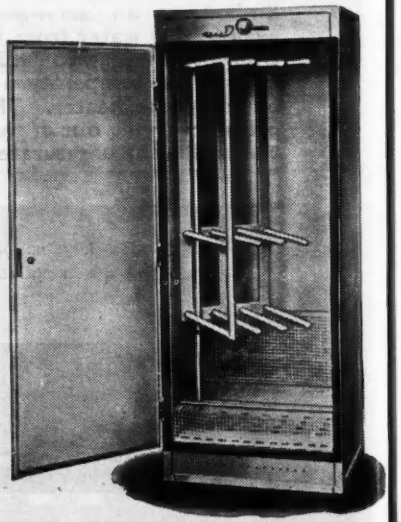
Makes thorough drying certain without hindrance or handicap

Let SnoWhite do the drying

AND DO IT THOROUGHLY whatever the weather

Clothing, laundry, hats, shoes—everything thoroughly dried and aired without trouble. Drying doesn't stop with SnoWhite when the rain starts.

SnoWhite DRYING CABINETS



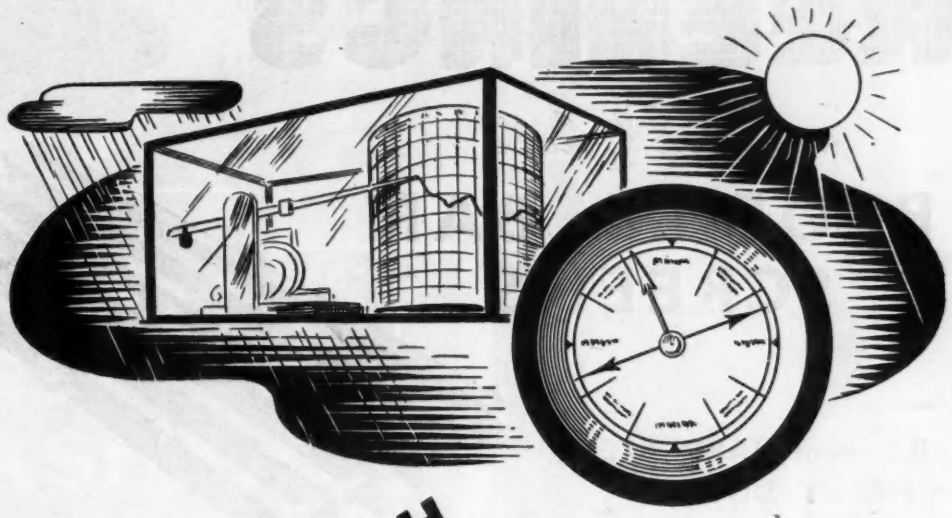
The heat can be varied to suit all requirements, whether for drying or airing. SnoWhite Cabinets can be supplied for small or large homes, hospitals, clubs, schools, institutions, etc.

OVER 600 MODERN SCHOOLS SUPPLIED

THERMOSTATIC CONTROL

Also manufacturers of the **STORMOR MOBILE** space-saving **STORAGE SYSTEM**

Write for full particulars to **J. GLOVER & SONS LTD., GROTON ROAD, LONDON, S.W.18**



ENGLISH WEATHER...

Where else can you find its equal ? No two days alike—every variation from fine to stormy—warm and damp one week, chilling winds the next, a hot sun followed by a cold wet spell. What paint can be expected to stand up to such constant changes—and keep exposed iron and steel work *completely* rust-proof—this year, next year and the next . . . ? Only a paint with sufficient elasticity to expand and contract under varying temperatures *without cracking*. And that means Dixon's Silica-Graphite Paint. Why not give it a trial this year.

DIXON'S
SILICA-GRAPHITE
PAINT

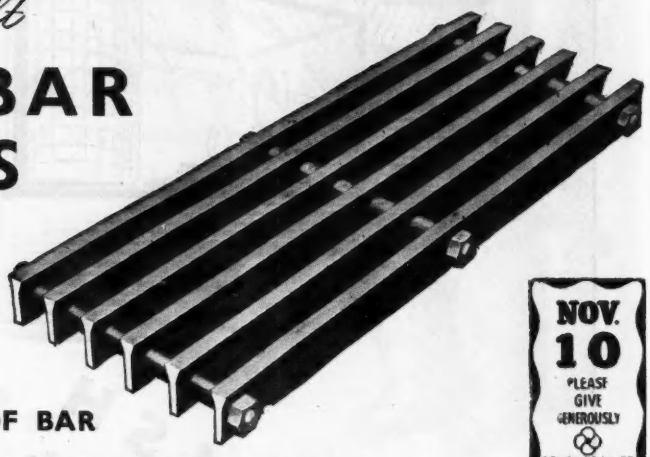
THE CHEAPEST PAINT · PER YEAR OF SERVICE ·

C. R. AVERILL LTD., 22 Duchy St., Stamford St., London, S.E.1
Telephone : WATerloo 4732/3. Telegrams: "Crucigraph, Sedist, London."

GREENING'S

"precision built"

PROFILE BAR SCREENS



BUILT from HARD STEEL for HEAVY DUTIES

IN FIVE STANDARD DEPTHS OF BAR

SPACERS AND CROSS RODS IN HEAVY GAUGES

NOV. 10 PLEASE GIVE GENEROUSLY REMEMBRANCE

NG90

N. GREENING & SONS, LTD., WARRINGTON, LANCS.
Makers of precision Screening Surfaces since 1799

'Phone: Warrington 1901

FOR AUTOMATIC IGNITION OF DOMESTIC COOKERS, FIRES, ETC. USE

METOLITE REGD

Lighter Flints

(PYROPHORIC ALLOYS)

Estd. 1928

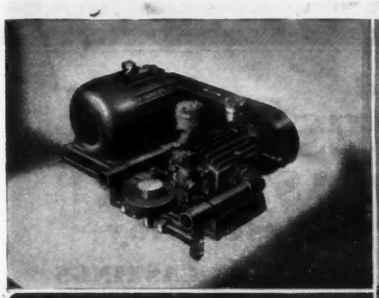
Supplies of All Types now available to Public Utilities

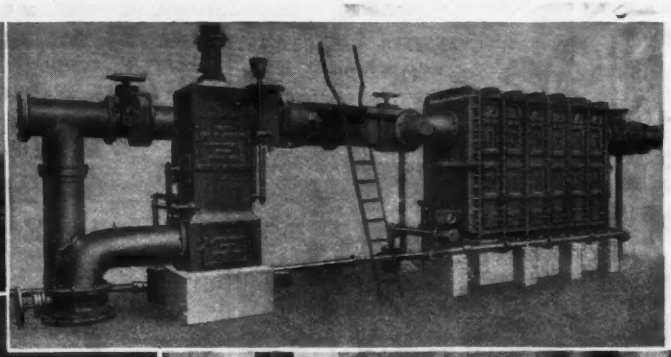
THE BRITISH FLINT & CERIUM MANUFACTURERS LTD.

PHONE Tonbridge 753 & 970

TONBRIDGE, KENT (CONTRACTORS TO H.M. GOVERNMENT)

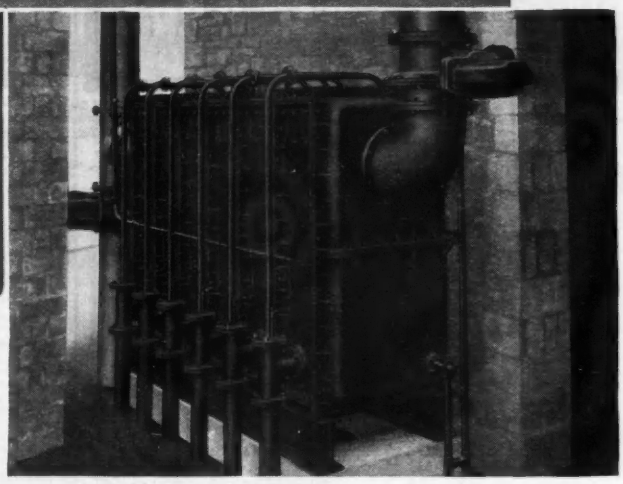
GRAMS: "Britflint, Tonbridge





PUMPLESS STATIC WASHERS

PATENT NO. 556082.



Top right illustration shows the "Eclipse" P. & A. Tar Extractor and "Pumpless" Static Washer in a Yorkshire Works.

New Simplified Circulating System

The maintenance and worry of mechanically operated parts is eliminated by the Clapham innovation for liquor circulation in static ammonia, naphthalene and benzole washers.

The liquid is circulated by compressed gas which, after giving up its mechanical energy, is returned to the gas stream.

The small compressor—the only mechanism in the plant—can be placed in the exhauster or other suitable house.

Liquid does not contact any moving part, the chief trouble in existing systems being thereby eliminated.

The installation embodies a neat and compact arrangement which is now standard in all Clapham washers.

CLAPHAM-BARWICK

"PUMPLESS" LIQUOR CIRCULATING SYSTEM

CLAPHAM BROS. LIMITED

MAKERS OF GAS WORKS EQUIPMENT SINCE 1837

KEIGHLEY-YORKS - Tel. 2787-2788 - Grams. "Clapham Bros., Keighley."

ONX FIRE CEMENT

ANOTHER GAS COMPANY states on Nov. 27th, 1944:

"We are pleased to report on the satisfactory way your special Patching Cement stood up on a repair to the front wall of one of our settings. The repair was round the producer charging hole, having to stand up to the worst conditions being subject to the heat from the setting, abrasion of hot coke, and cold quenching water, and is still standing up well after three months."

Sets like a ROCK under heat
ONX 'SUPER 83' BRAND for RETORTS
A.L.CURTIS Westmoor Works CHATTERIS Cambs.

If you need
PRESSURE DIECASTINGS
in Zinc Base Alloy
enquire of GILLS PRESSURE CASTINGS
215 Tyburn Road, Erdington
Birmingham, 24
Telephone EAST 1008
Formerly Die-Casting Department of H. GILL STAMPINGS Limited

E. E.
JEAVONS & CO. LTD.
TIPTON
DISTRIBUTION SPECIALISTS
Civil Engineering Contractors · Reinforced Concrete Structures · Railway Sidings
Telephone: TIP. 1621 Telegrams: "PIPELINES"

METRONIC
RECORDERS
A comprehensive range of pressure and flow measuring instruments, all operated by modified U tubes for sheer sensitivity. Flow Indicators and Recorders are driven by the latest METRONIC Ring Balance movement carried on Floating Ball Journals, which supersede knife edges.
A particular interest is taken in devising special apparatus for "out-of-the-ordinary" jobs.
THE METRONIC INSTRUMENT CO. LTD.
SPECIALISTS IN FLUID MEASUREMENT
196, GROVE LANE : SMETHWICK, 40

Best of Fittings

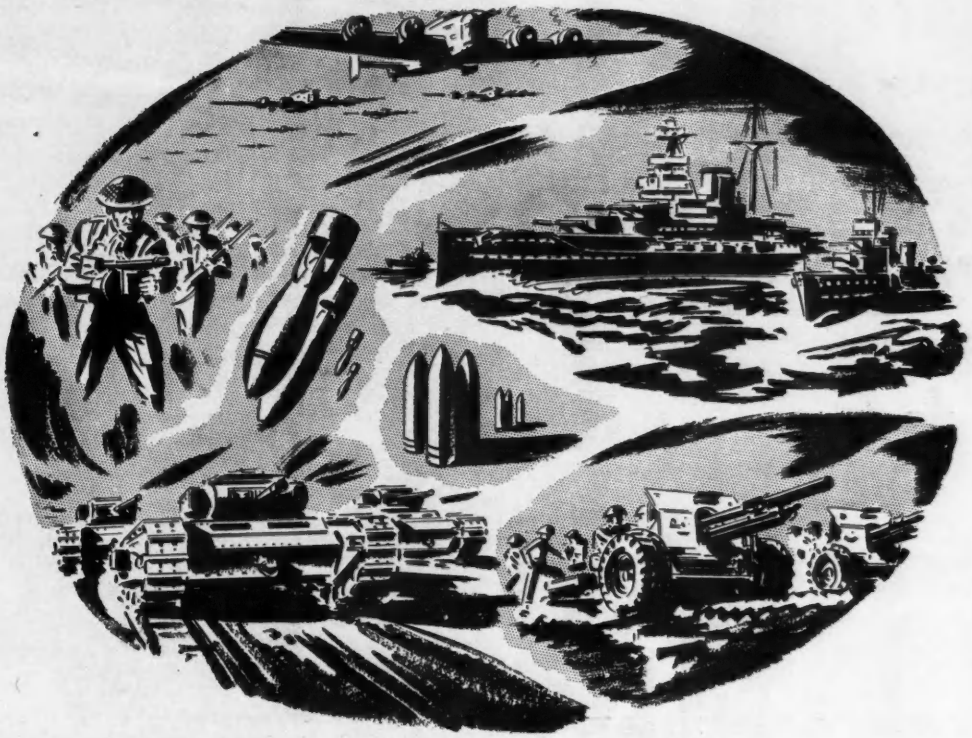
BRITISH FITTINGS CO. (HENDON) LTD.
ADRIAN AVENUE, NORTH CIRCULAR ROAD, N.W.2
London Stock Telephone: GLA 6363
Manchester Stock

"WASK" HIGH TENSILE MALLEABLE PIPE FITTINGS
OVER 4000 SIZES
INDIVIDUALLY AIR TESTED
STANDARD TAPER THREADS
FULL THICKNESS THROUGHOUT
Fit and forget!

MADE BY THE MAKERS OF—
"Wask" Up and Down Patent Lamp Suspenders, the NON-DISCONNECTING raising and lowering gear.
WALTER SLINGSBY & CO., LTD.
NEW DAM WORKS · · · KEIGHLEY
Phone: Keighley 3749 (2 lines). Grams: Malleable Keighley

"Everything for Safety Everywhere."
SMOKE HELMETS. GAS MASKS
BREATHING APPARATUS OF ALL PATTERNS
OXYGEN RESUSCITATING APPARATUS.
FIRE EXTINGUISHERS. FIRST-AID OUTFITS
SAFETY AND PROTECTIVE APPLIANCES OF ALL DESCRIPTIONS.
SIEBE, GORMAN & CO. LTD.,
WESTMINSTER BRIDGE ROAD, LONDON, S.E.1.
Telegrams "Sick, Lamb, London" Telephone No. Waterloo 6011

MASTERLY MEASUREMENT No. 3.



MEASURED STRENGTH

Our National Strength is measured in terms of might, production, determination and unity. These characteristics have been maintained on a foundation of quality throughout the rigours of war.

A high standard of quality is responsible for the constant reliability of Gas Meters serving the multitudinous demands of every type of Industry.

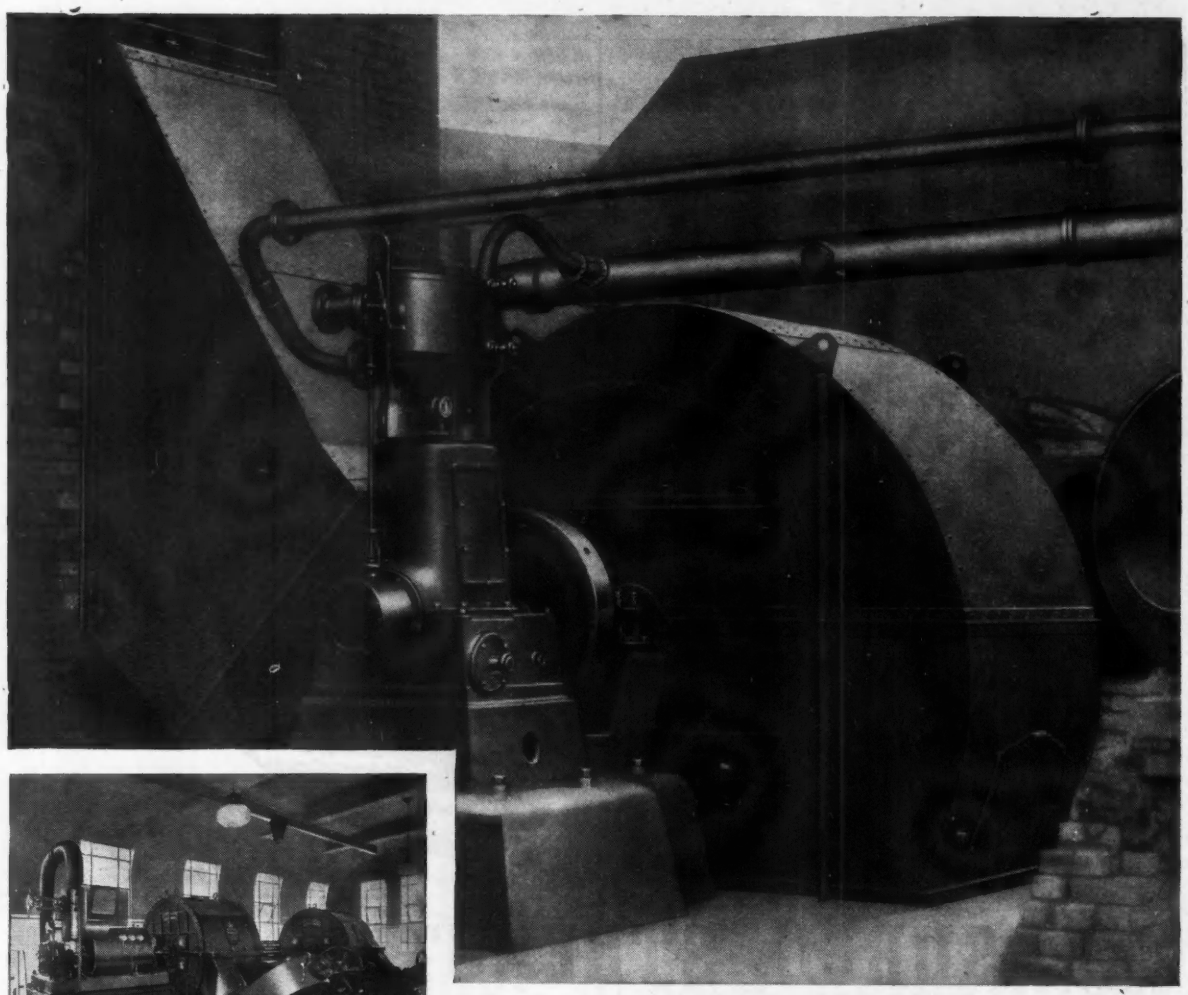
Gas Meter Company meters, in constant service through years of peace and war, do their job and tell their own story.

THE GAS METER COMPANY LTD.

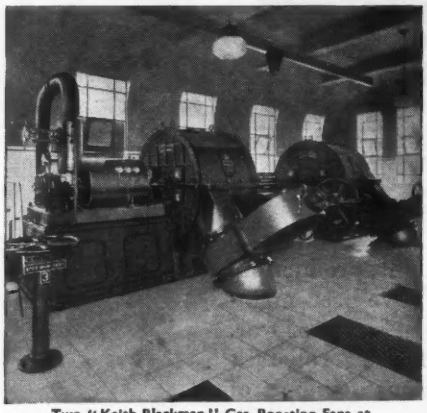
FOR ALL TYPES OF METERS.
Full particulars sent on application to—

238, KINGSLAND ROAD, LONDON, E.2, and at OLDHAM and MANCHESTER

CMGM.3.



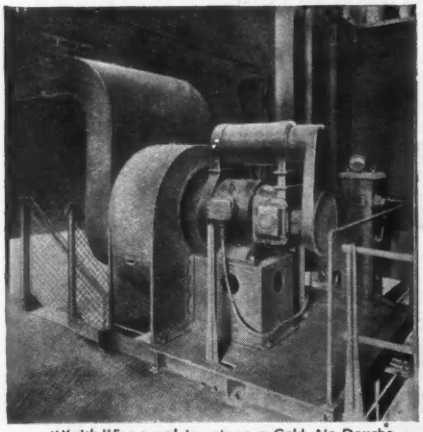
"Keith" Centrifugal Fan providing induced draught to boiler fires.



Two "Keith Blackman" Gas Boosting Fans at large Gas Works.

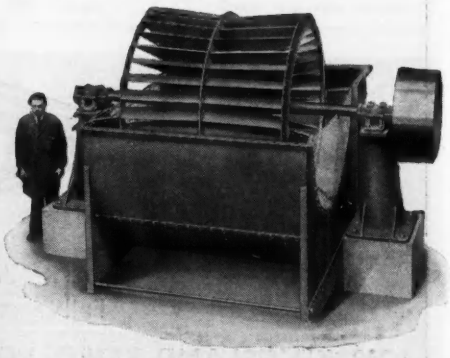
There is a KEITH BLACKMAN FAN for every purpose in the Gas Industry for which a fan is essential . . . . .

Mechanical Draught Fans
Fans for Gas Boosting
Cold Air Douche Fans
Furnace Re-circulating Fans
Fans for Ventilation
Portable Man-Cooling Fans
Fans for Forge Blowing, etc.



"Keith" Fan supplying air to a Cold Air Douche Plant at a Gas Works.

KEITH BLACKMAN FANS



Large belt-driven double-inlet "Keith" Fan with top casing removed.

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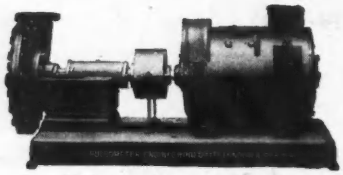

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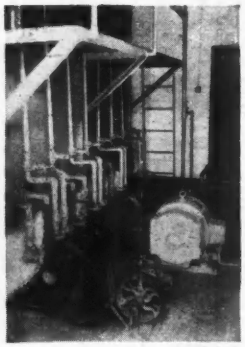

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